

## Owner/Applicant Signature Authorization

FPL Duct Bank - 6500 to 6900 Collins Avenue - WR#7766980

Project Name: \_\_\_\_\_

Application and/or Permit # (if available): \_\_\_\_\_

I hereby designate and authorize the agent listed below to act on my behalf, or on behalf of my corporation, as the agent in the processing of this application for the permit and/or proprietary authorization indicated above; and to furnish on request supplemental information in support of this application. In addition, I authorize the below-listed agent to bind me, or my corporation, to perform any requirement which may be necessary to procure the permit or authorization.

I understand that knowingly making any false statement or representation in this application is a violation of Section 373.430, F.S. and 18 U.S.C Section 1001.

Printed Name of Authorized Agent: Timothy P. Tedesco

Signature of Authorized Agent: 

Date: 4/20/18

FPL - Joel Garcia

Typed/Printed Name of Owner/Applicant: \_\_\_\_\_

Corporate Title if Applicable: Engineer

Signature of Owner/Applicant: 

Date: 4/24/18



**TIERRA CONSULTING GROUP**

ENVIRONMENTAL ENGINEERING & CONSULTING

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June 8, 2018

Mr. Simon Sunderland, P.G.  
South Florida Water Management District  
Water Use Bureau  
3301 Gun Club Road  
West Palm Beach, FL 33406-3007

**Subject: SFWMD Consumptive Water Use Permit Application**  
Florida Power & Light Company (FPL) Duct Bank Installation  
Collins Avenue between 65<sup>th</sup> and 69<sup>th</sup> Street, Miami Beach, FL – WR# 7766980

Dear Mr. Sunderland,

On behalf of the Florida Power & Light Company (FPL), Tierra Consulting Group (TCG) proposes a dewatering plan to install subsurface electrical duct bank near Latitude 25°54'24.97" North / Longitude 80°07'12.94" West. The Florida Department of Transportation (FDOT) is the property owner of record for the Collins Avenue right-of-way. **Figure 1** shows the project location.

**1.0 Project Description**

Dewatering is necessary to install concrete-encased electrical duct banks along Collins Avenue, including five manholes. The trenching begins from approximately 20 feet west of existing manhole MH# 6899-2AVE (8MA07901) running south for approximately 400 feet into proposed manhole MH# 6802-2A (8MAXXXX), then continues south for approximately 420 feet into proposed manhole MH# 6769-2A (8MAXXXX).

The trench extends south approximately 400 feet into proposed manhole MH# 6702-2A (8MAXXXX), runs south for 420 feet into proposed manhole MH# 6592-2A (8MAXXXX), then runs south for 400 feet connecting into proposed manhole MH# 6532-2A (8MAXXXX), and east (cross section "HH") for 20 feet terminating at existing manhole MH# 6531-2A (8MA08308).

This project also includes several locations where this duct bank laterals into existing manholes. Just north of station 27+00, the concrete-encased duct bank (cross section "AA") laterals east for approximately 20 feet into existing manhole MH# 6827-2AVE (8MA08319). At station 25+00, the concrete-encased duct bank (cross section "BB") laterals east for approximately 20 feet into existing manhole MH# 6775-2A (8MA08318). This segment does not require dewatering.

In addition, from proposed manhole MH# 6702-2A (8MAXXXX), open trench (cross section "CC") laterals to the northeast for approximately 20 feet and connects into existing manhole MH# 6769-2A (8MA08303). Just north of station 19+00, the concrete-encased duct bank (cross section "DD") laterals east for approximately 20 feet into existing manhole MH# 6745-2A (8MA08302). From existing manhole MH# 6701-2A (8MA08313) a 100-foot segment (cross section "EE") runs along 67th Street to existing manhole MH# 219 – 67S (8MA08304).

At proposed manhole MH# 6592-2A (8MAXXXX), open trench (cross section “FF”) extends northeast for approximately 20 feet into existing manhole MH# 6601-2A (8MA08310). South of station 12+07, the duct bank (cross section “GG”) laterals 20 feet east and connects into existing manhole MH# 6551 – 2A (8MA08301).

The five proposed manholes contribute an additional 100 linear feet of trenching. The total excavated trench length is approximately 2,380 feet across one-hundred and nineteen trench sections. The trenched duct bank will be formed and cast in a 2.5-foot wide linear trench by 20-foot long segments; manholes will be installed in 10-foot wide by 20-foot long excavations. Site plan and dewatering locations with subsurface profiles are shown on the revised FPL Site Drawings (No. MBPPTBD1 through MBPPTBD5), in **Figure 2**.

## 2.0 Estimation of the Dewatering Radius of Influence & Maximum Flow Rate

TCG used Sichardt’s Equation to calculate the dewatering groundwater volume based on the hydraulic conductivity ( $K = 28$  feet/day or 0.0000988 meters/second) and aquifer depth ( $H = 220$  feet) provided in a technical report for a nearby reference site as follows: *Florida Civil, Blvd at Lenox, 6901 Collins Avenue, Miami Beach, FL, November 2016*. Select pages of the reference document are provided in **Attachment A**.

The calculated maximum radius of influence (ROI) and dewatering flow rate are 159 feet and 342 gallons per minute (gpm), respectively. The estimated maximum daily dewatering pumpage calculated using Sichardt’s Equation is 164,354 gallons per day. The variables and supporting calculations for these values are provided in **Attachment A**.

## 3.0 Contaminated Facilities File Review

Regulatory file information indicates six contaminated facilities located near the proposed duct bank route. Each contaminated facility location relative to the project site is shown on **Figure 3**.

Facility Name	Address	Facility Type	Pollutant Type	Regulatory Status	Facility ID
Bel Aire Hotel	6515 Collins Avenue	Hotel	Petroleum	Awaiting Assessment	FAC ID: UT-4437
Vista Villas Apartments	6727 Indian Creek Drive	Residential	Petroleum	Assessment	FAC ID: UT-4458
Sudsies Dry Cleaners & Laundromats	6792 Collins Avenue	Dry Cleaners	Solvents	Awaiting Funding for Assessment	FAC ID: IW5-5969
South Carillon Beach Condo Assoc. (Canyon Ranch Hotel & Spa)	6799/6801 Collins Ave.	Hotel	Petroleum	Proposed for NFAC	FAC ID: UT-4447
Saratoga Apartments	6834 Harding Avenue	Residential	Petroleum	Assessment	FAC ID: UT-4640
Newport Apartments	6860 Harding Avenue	Residential	Petroleum	Assessment	FAC ID: UT-4452

### Bel Aire Condominium

This condominium is identified historically and presently as a residential building equipped with a heating oil underground storage tank (UST). A January 2009 York FDEP Scoring Review indicated groundwater contamination was present in the site boundaries. In October 2017 FDEP Notice of Funding Availability

for Assessment was issued to Bel Aire Condominium Association. Select pages of the regulatory file documents are included as **Attachment B**.

The calculated maximum ROI for the nearest dewatering excavation (Section 1) is an estimated 96 feet. The distance separating Section 1 from the impacted site is approximately 100 feet east. Based on the nearly equal distance from the proposed FPL dewatering activities to the impacted site and the estimated ROI, the dewatering activities may slightly, and temporarily, influence a residual dissolved-contaminant plume, if a plume is present.

#### **Vista Villas Apartments**

A March 2018 Low-Scored Site Initiative (LSSI) Site Assessment Report concluded that no groundwater contamination existed but recommended an additional round of groundwater sampling prior to requesting No Further Action and a Site Rehabilitation Completion Order. Select pages of the regulatory file document are included as **Attachment B**.

The calculated maximum radius of influence for the nearest dewatering excavation (Section 61) is an estimated 137 feet. Based on the distance separating Section 61 from the contaminated site (approximately 363 feet west), proposed FPL dewatering activities are not expected to influence the suspected residual dissolved-contaminant plume.

#### **Sudsies Dry Cleaners & Laundromats**

The property is identified historically as a dry-cleaners and laundromat. A December 2011 FDEP Rapid Risk Screening Form reported dry-cleaning contaminants were below Groundwater Cleanup Target Levels (GCTLs). The site is awaiting completion of a formal assessment. Select pages of the regulatory documents are included as **Attachment B**.

The calculated maximum radius of influence for the nearest dewatering excavation (Section 54) is an estimated 90 feet. Based on the distance separating Section 54 from this site (approximately 120 feet west), but with no confirmed groundwater impact, the proposed FPL dewatering activities are not expected to influence any potential contaminants beneath the Sudsies Dry Cleaners & Laundromat facility.

#### **South Carillon Beach Condo Assoc.**

The property is identified historically and presently as a residential condominium with an emergency generator. In August 2014, South Carillon Beach Condo/Canyon Ranch Hotel & Spa was proposed for No Further Action with Conditions (NFAC) to resolve a May 2008 fuel discharge. A restrictive covenant was filed with the Department of Regulatory and Economics Resources – Division of Environmental Resources Management (DERM), and as of February 2017, DERM was coordinating the Notice of Intent documentation with the property owner. Select pages of the regulatory file documents are included as **Attachment B**.

The calculated maximum radius of influence for the nearest dewatering excavation (Section 44) is an estimated 159 feet. Based on the distance separating Section 44 from this contaminated site (approximately 200 feet east), proposed FPL dewatering activities are not expected to influence the suspected residual dissolved-contaminant plume.

#### **Saratoga Apartments**

This site initially was developed as a residential apartment building in 1955, and a Discharge Reporting Form (DRF) was completed on October 18, 1994 following the closure of a heating oil UST. In April 1996,



FDEP assigned a priority cleanup score of 9 and a 2017 DERM Field Inspection Summary Form assigned a score of 6. Select pages of the regulatory file document are included as **Attachment B**.

The calculated maximum radius of influence for the nearest dewatering excavation (Section 21) is an estimated 159 feet. Based on the distance separating Section 21 from this contaminated site (approximately 350 feet west), proposed FPL dewatering activities are not expected to influence residual groundwater contaminants.

#### **Newport Apartments**

This site is currently and has historically been used for residential purposes. In 1994, during removal of a 250-gallon heating oil UST, the UST was observed as breached and oil sheen was noted in the DRF. In 2016 and 2018, soil samples confirmed contaminants above SCTLs. The 2018 SAR recommended soil excavation and groundwater monitoring. Select pages of the regulatory file are included as **Attachment B**.

The calculated maximum radius of influence for the nearest dewatering excavation (Section 11) is an estimated 96 feet. Based on the distance separating Section 11 from this contaminated site (approximately 350 feet west), proposed FPL dewatering activities are not expected to influence residual groundwater contaminants.

Groundwater flow in the immediate vicinity is tidally-influenced with no discernable groundwater flow direction. Based on the location of the confirmed impacted facilities beyond the maximum ROI and the expectation that some natural attenuation has occurred, the proposed dewatering activities are not expected to influence groundwater at these facilities.

#### **4.0 Dewatering Plan**

Surface elevation at the proposed dewatering site varies with a maximum elevation of +7.6 feet relative to the Miami Beach Vertical Datum (MBVD). Average groundwater elevation at the proposed dewatering site is +2.27 feet MBVD; and the maximum bottom elevation of the excavations is -2.80 feet MBVD.

Dewatering fluids will be pumped from one excavation trench to a 20,000-gallon mobile weir tank adjacent to the excavation, using a self-priming six-inch (6") trash pump, or equivalent, then to another segment of the excavation utilized for infiltration purposes (trench-to-trench method) within the FDOT right-of-way. Calculations of infiltration trench size requirements are provided in **Attachment A**.

If the trench to trench method does not provide sufficient infiltration, dewatering fluids will be directed from the sedimentation weir tank using a self-priming six-inch (6") trash pump, or equivalent, to temporary shallow 24" diameter drainage wells installed within the FDOT right-of-way. The placement of these temporary drainage wells will be strategically located to minimize the "short circuiting" of active trench dewatering. The total well depth will not exceed 40 feet bgs, with steel casing to 35 feet bgs. The proposed locations of the temporary shallow drainage wells are shown in **Figure 2**.

Dewatering fluids discharged to these drainage wells will be treated through a 20,000-gallon sedimentation weir tank and monitored for turbidity. Monitoring will comply with Section 24-44.2(3) of the Code of Miami-Dade County. Dewatering assumptions are based on the time required to dig, dewater, form and cast duct bank and install manholes during daylight working hours. Dewatering duration for duct bank installation is estimated at eight (8) hours per day for one hundred and nineteen (119) working days. Pump and sedimentation tank specification data is included as **Attachment C**.

#### **4.1 Soil and Sediment Management Plan**

Soil excavated from the trench for the project will be stockpiled and the soil covered with polypropylene sheeting to deter runoff. Upon completion of duct installation work, the stockpiled soil will be returned to the trench as backfill.

Dewatering fluid discharge will first be processed through a sedimentation tank to allow sediment to settle from the effluent prior to discharge. Accumulated sediment will be removed from the tank, as necessary, and returned to the excavation from which it originated at the completion of dewatering work.

#### **4.2 Stormwater Management**

The intent is to pump dewatering effluent from the excavation trench into a temporary sedimentation weir tank. Temporarily stored effluent will then be discharged back to a segment of the excavation utilized for infiltration purposes or to temporary shallow drainage wells. Therefore, no discharge to surface waters will occur and the provisions of F.A.C. Section 62-621.300 – Permits, are not applicable.

The dewatering project scope is to install approximately 2280 linear feet of cable duct including five manholes to facilitate future power connections to the surrounding neighborhood. No grading work that changes the existing grade or surface drainage flow will be performed and no vegetation clearing work is required to perform the work.

The area requiring excavation (i.e., the dewatering area) is approximately 2280 ft. in length by 2.50 ft. wide for open trenches, plus 100 ft. in length by 10 ft. wide for manholes, for approximately 6,700 square feet. If we assume the excavation area increases by 25 percent in width due to limited over excavation, sidewall sloping to comply with OSHA excavation safety requirements, etc., the total disturbed area represents approximately 8,375 square feet (0.19 acre), substantially below the 1.0-acre threshold for which a construction project SWPPP is a requirement. Therefore, the provisions of F.A.C. Section 62-621.300(4) are not applicable.

Best Management Practices (BMPs) to control sedimentation and stormwater pollution runoff will be observed during dewatering operations. Existing catch basins and accessible drainage entry points at the site will be protected with curb barriers, including hay bales wrapped in silt filter fabric and/or booms, to deter sediment in stormwater from entry into the existing roadway drainage system.

#### **5.0 Owner's Permission to Perform Work**

FDOT is the property owner for the roadway where dewatering activity will occur. FDOT is currently reviewing the formal FPL application for the ROW permit, and TCG will provide it once available.

#### **6.0 Dewatering Discharge Point Approval**

The work planned is within the right-of-way owned by FDOT, and the discharge of dewatering fluids will remain within the right-of-way.

#### **7.0 Conclusion**

The proposed FPL dewatering activities are necessary to lower natural groundwater elevation to install one hundred and nineteen sections of concrete-encased cable duct bank and five manholes along Collins Avenue in Miami Beach. The installation is required to provide electrical service to the adjoining properties.

Six contaminated sites were identified in the project site vicinity. The presence of a petroleum impacted site located at the very edge of the calculated ROI for one site indicates a slight potential for dewatering activities to temporarily influence a residual dissolved-contaminant plume, if a plume is present within that limited portion of the overall project area.

However, based on the location of the other contaminated facilities beyond the maximum calculated ROI, the proposed short-term dewatering activities will not influence groundwater at these contaminated facilities. TCG concludes the FPL project, with maximum radius of influence of 159 feet, flow rate of 342 gpm and daily pumping of 164,354 gallons/day will not adversely impact the overall condition of the shallow groundwater aquifer.

Contact information for the entity assuming responsibility for the conditions of the permit is:

Florida Power & Light Company  
Mr. Joel Garcia  
122 SW 3<sup>rd</sup> Street  
Miami, FL 33130

If additional information is required to expedite review and approval of dewatering activities, please contact Tim Tedesco ([Tedesco@tierraconsulting.com](mailto:Tedesco@tierraconsulting.com)) on mobile number (941) 224-4640 or our office at (954) 202-9226 with any questions.

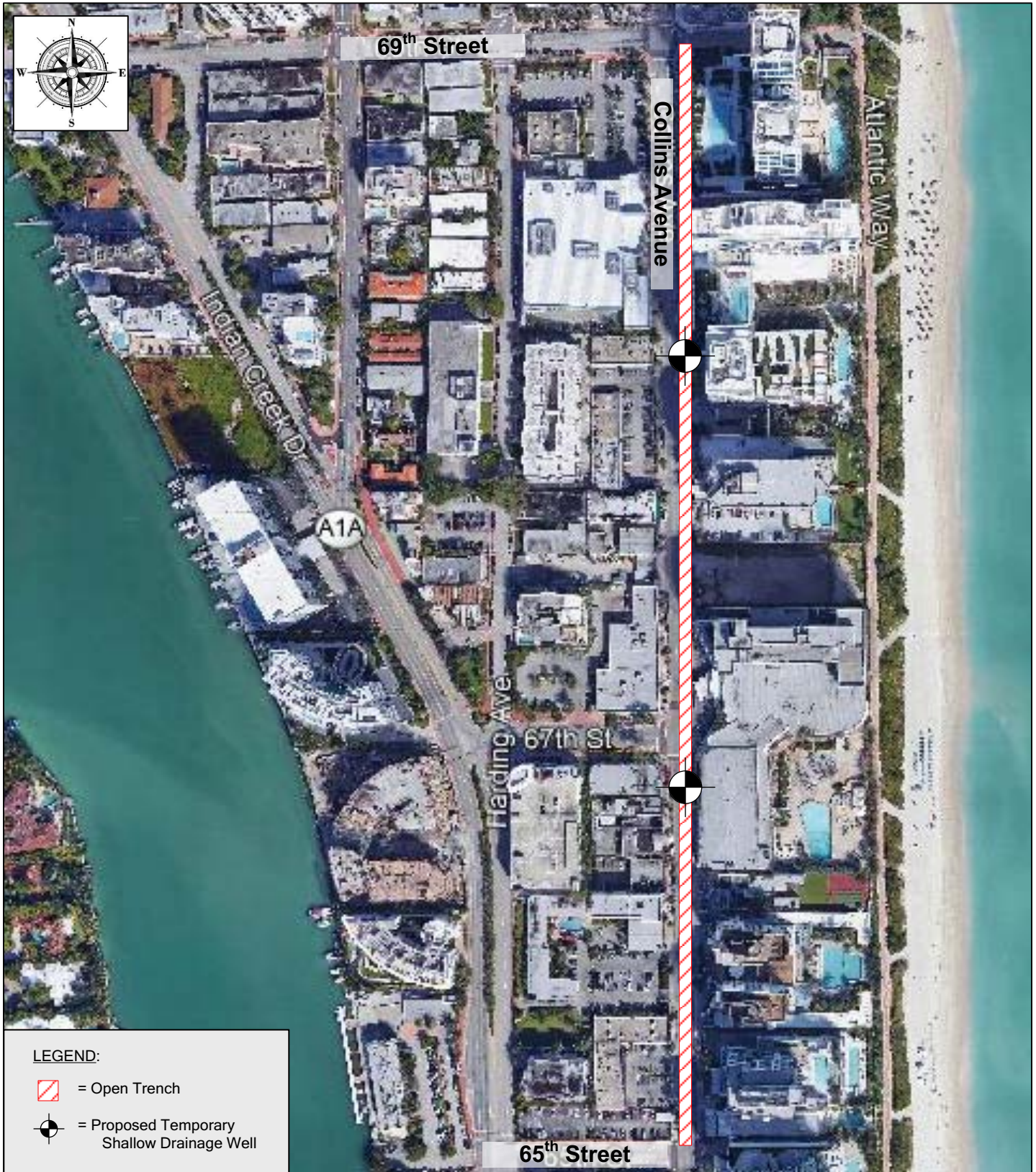
Respectfully,


**Robert L. Vinson III**  
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Robert L. Vinson III, P.E.  
Senior Project Engineer

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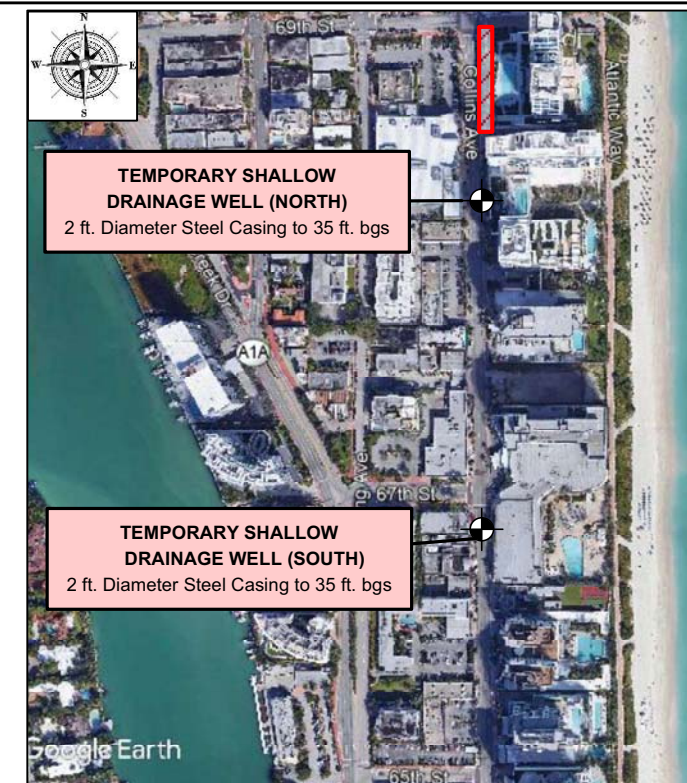
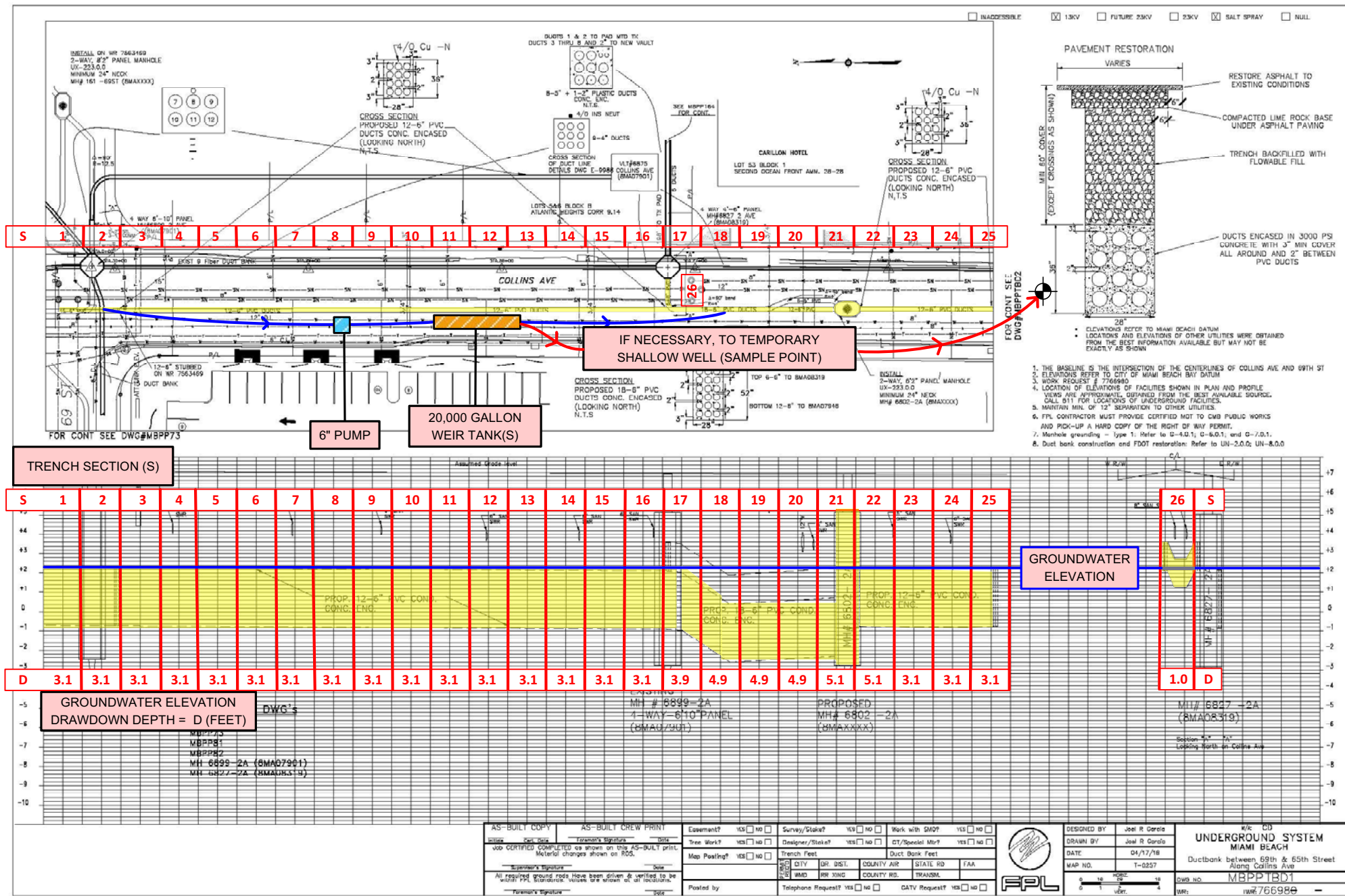
FIGURE 1



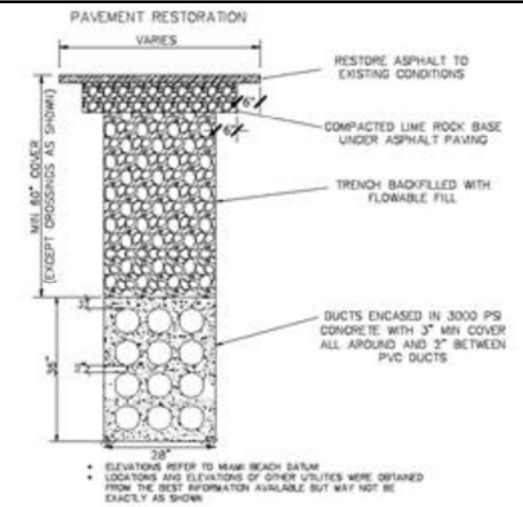
 <p><b>TCG</b> TIERRA CONSULTING GROUP INTEGRITY, EXCELLENCE, COMMITMENT</p>	PROJECT: COLLINS AVENUE BETWEEN 65 <sup>TH</sup> AND 69 <sup>TH</sup> STREET, MIAMI BEACH, FL WR - 7766980		CLIENT: FLORIDA POWER & LIGHT CO.	
	FIGURE 1 - PROJECT LOCATION MAP	SCALE: 1" = 300'	DATE: 04/20/2018	DRAWN BY: TT
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## FIGURE 2





PROJECT LOCATION MAP



TYPICAL TRENCH DETAIL



PROJECT: COLLINS AVENUE BETWEEN 65<sup>TH</sup> AND 69<sup>TH</sup> STREET ,  
MIAMI BEACH, FL – WR # 7766980

FIGURE 2 - PLAN AND PROFILE VIEW  
DRAWING

TCG PROJECT NO. 16810

CLIENT: FLORIDA POWER & LIGHT  
COMPANY

DRAWN BY: TT 04/20/2018

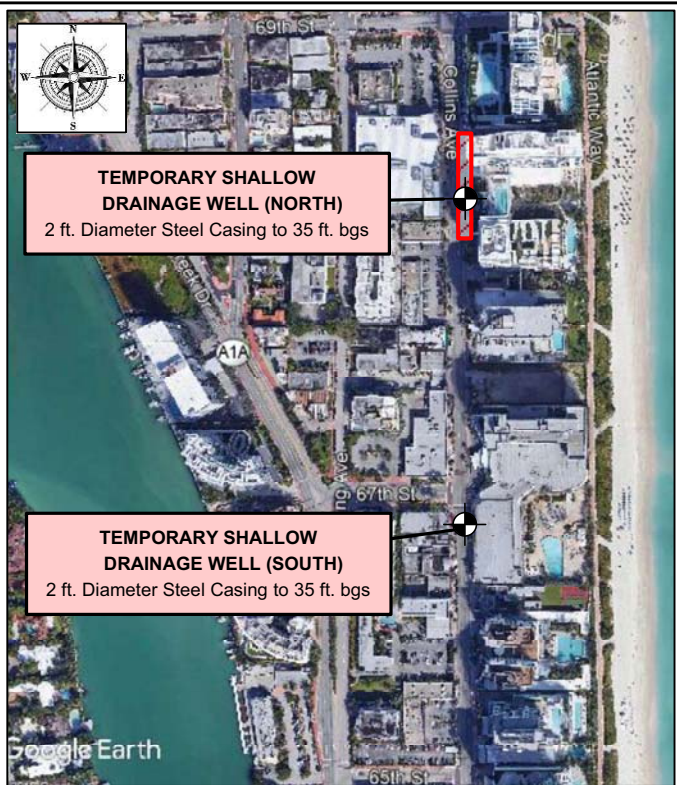
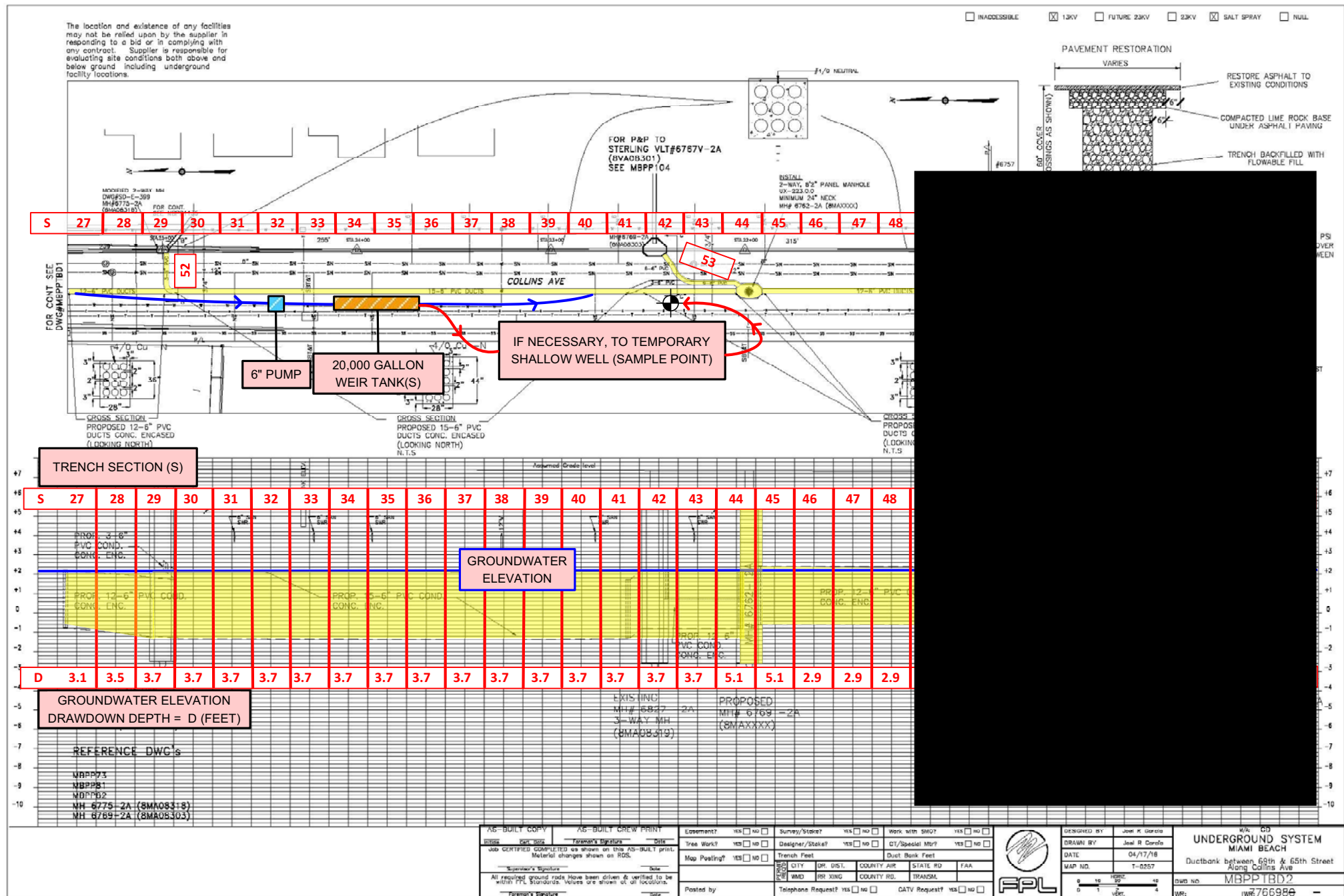
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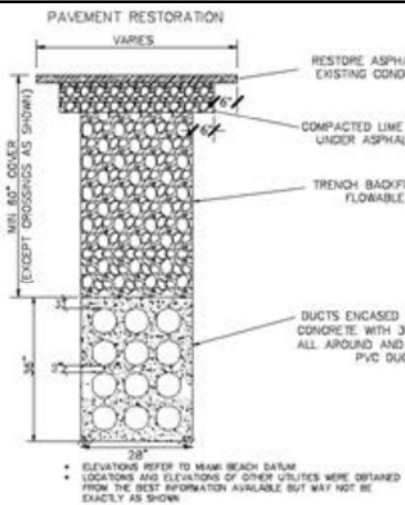
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PROJECT LOCATION MAP



TYPICAL TRENCH DETAIL

PROJECT GENERAL NOTES : Maximum Daily Pumpage: 164,354 US Gallons/day

Maximum Excavation/Dewatering Depth: -2.80 ft MBVD



PROJECT: COLLINS AVENUE BETWEEN 65<sup>TH</sup> AND 69<sup>TH</sup> STREET ,  
MIAMI BEACH, FL – WR # 7766980

FIGURE 2 - PLAN AND PROFILE VIEW  
DRAWING

TCG PROJECT NO. 16810

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COMPANY

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SHEET 2 OF 5

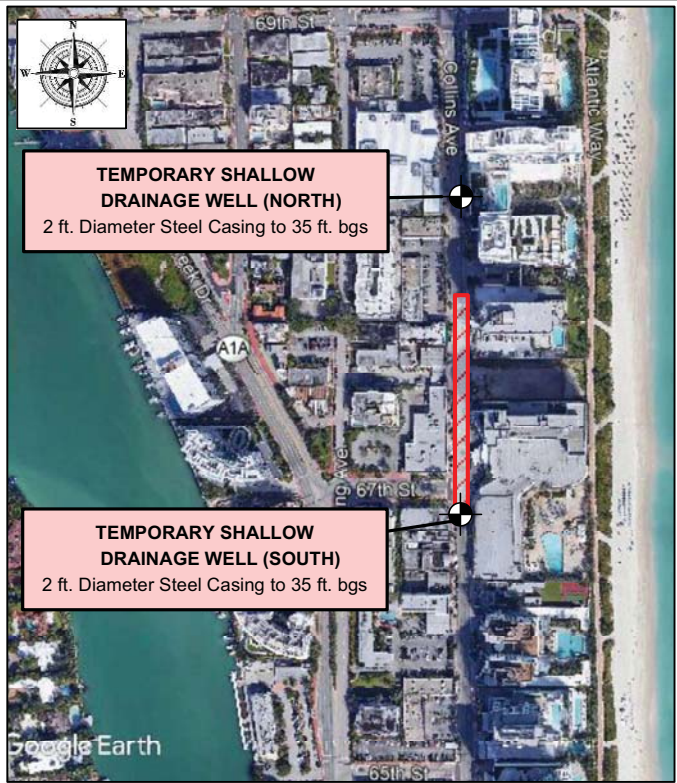
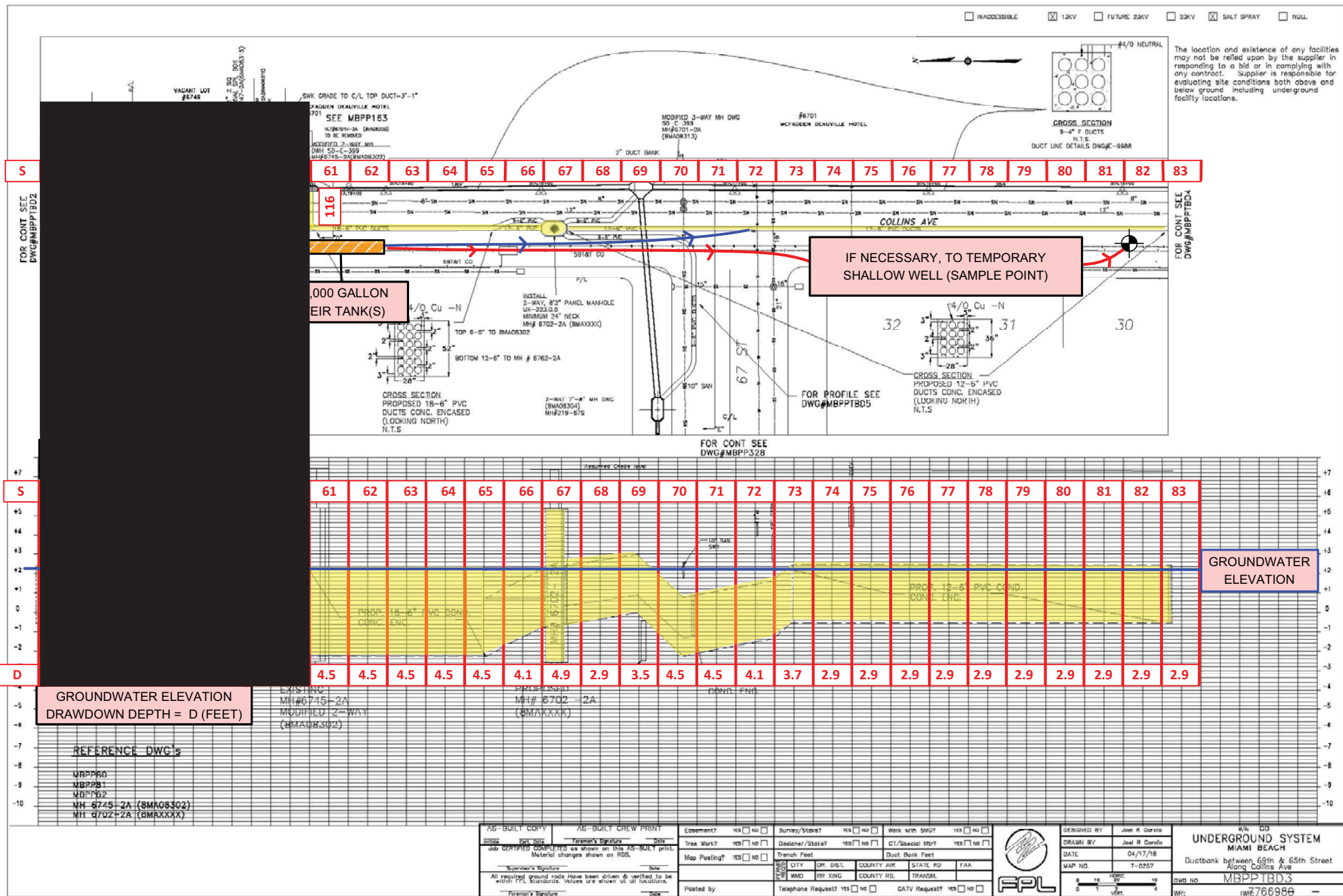
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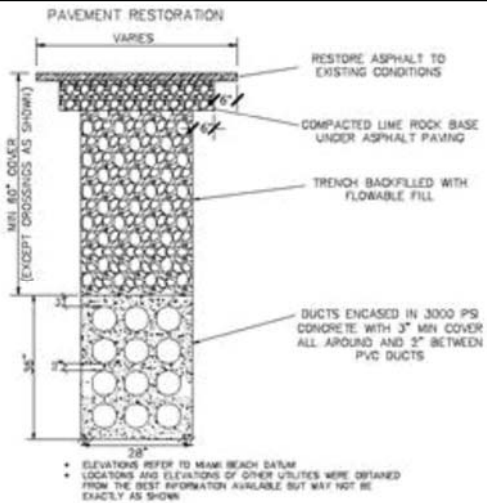
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PROJECT LOCATION MAP



TYPICAL TRENCH DETAIL

PROJECT GENERAL NOTES : Maximum Daily Pumpage: 164,354 US Gallons/day      Maximum Excavation/Dewatering Depth: -2.80 ft MBVD



PROJECT: COLLINS AVENUE BETWEEN 65<sup>TH</sup> AND 69<sup>TH</sup> STREET ,  
MIAMI BEACH, FL – WR # 7766980

FIGURE 2 - PLAN AND PROFILE VIEW  
DRAWING

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COMPANY

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SHEET 3 OF 5

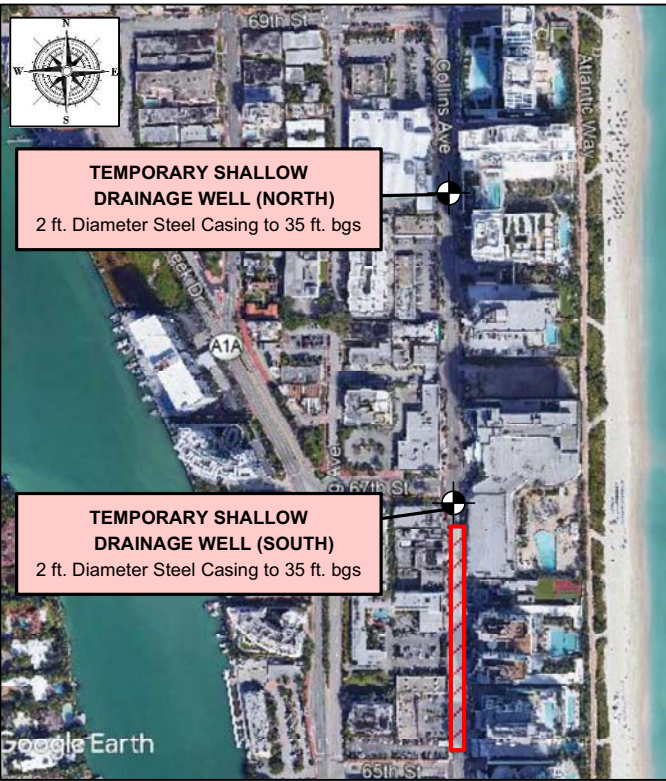
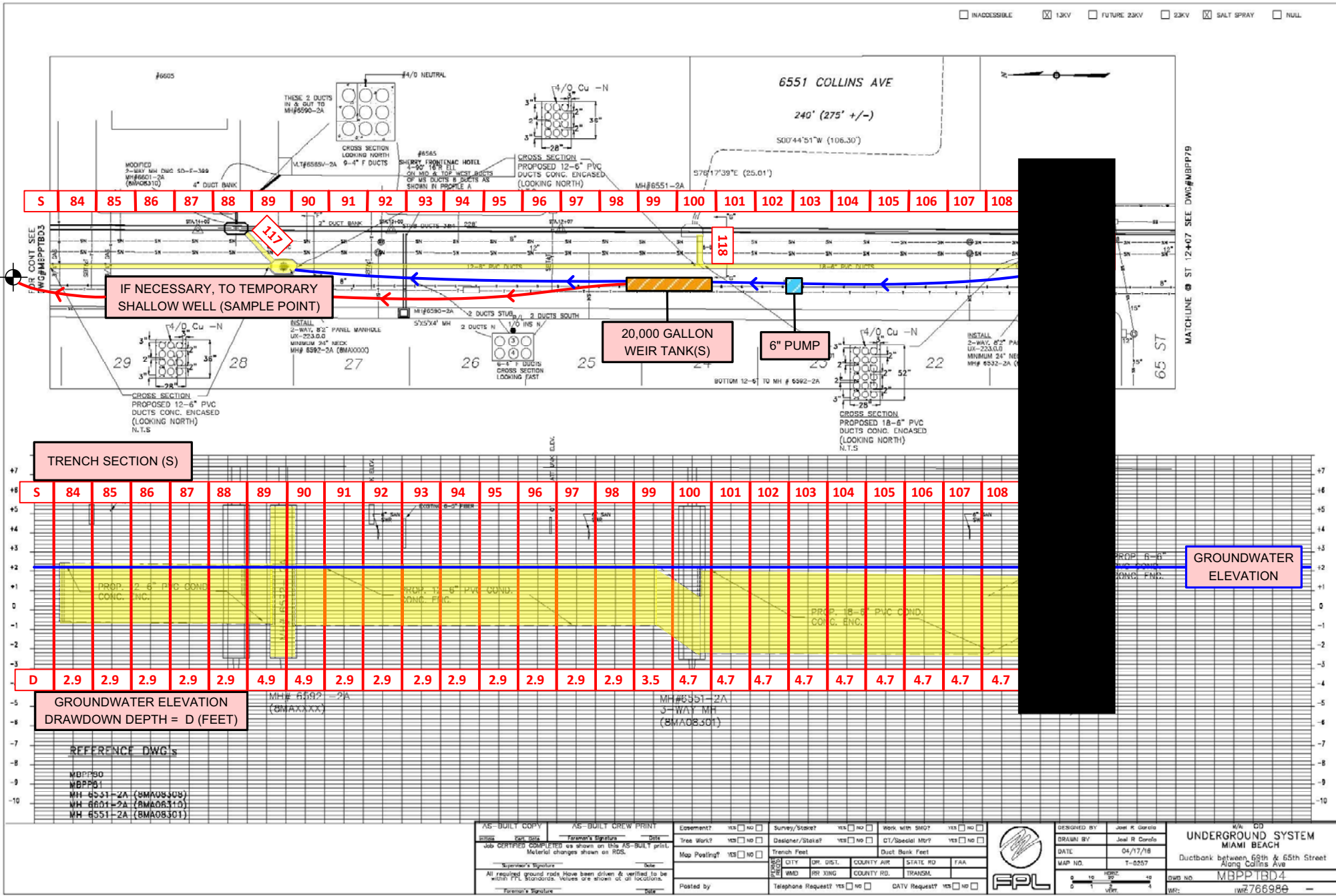
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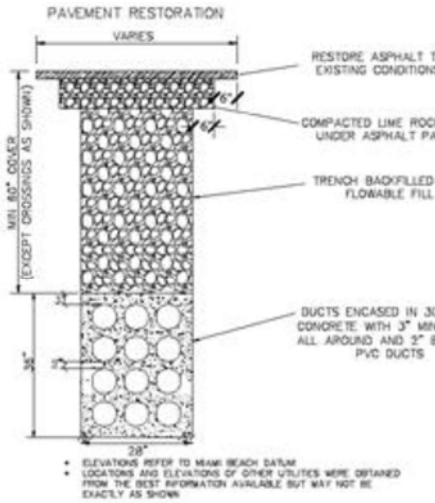
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PROJECT LOCATION MAP



TYPICAL TRENCH DETAIL

PROJECT GENERAL NOTES : Maximum Daily Pumpage: 164,354 US Gallons/day Maximum Excavation/Dewatering Depth: -2.80 ft MBVD



PROJECT: COLLINS AVENUE BETWEEN 65 <sup>TH</sup> AND 69 <sup>TH</sup> STREET , MIAMI BEACH, FL – WR # 7766980		CLIENT: FLORIDA POWER & LIGHT COMPANY	
FIGURE 2 - PLAN AND PROFILE VIEW DRAWING	TCG PROJECT NO. 16810	DRAWN BY: TT 04/20/2018	SHEET 4 OF 5
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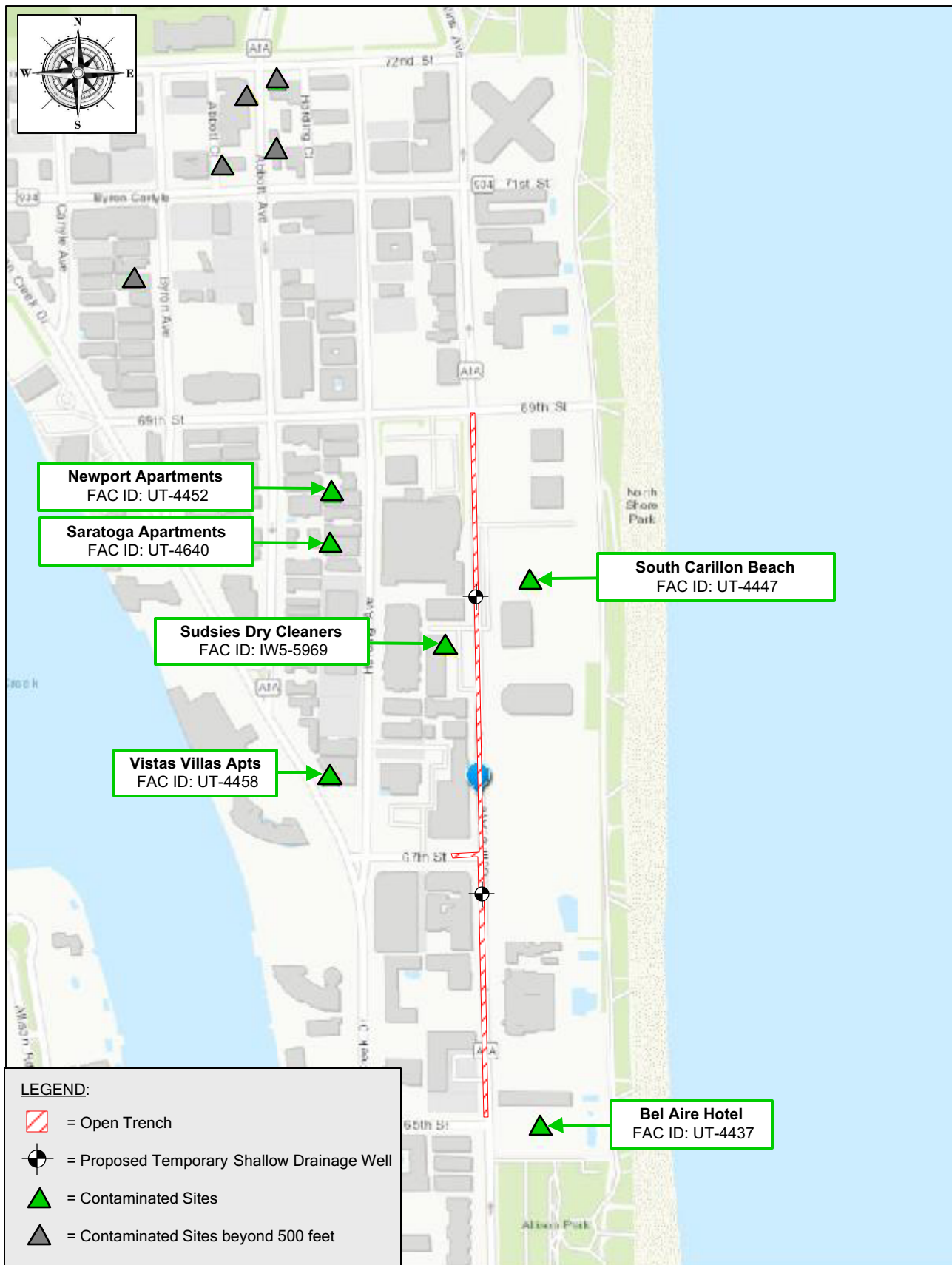
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FIGURE 3



PROJECT: COLLINS AVENUE BETWEEN 65<sup>TH</sup> AND 69<sup>TH</sup> STREET, MIAMI BEACH, FL, WR # 7766980

CLIENT: FLORIDA POWER & LIGHT CO.

FIGURE 3 - FDEP CONTAMINATION LOCATION MAP

SCALE: 1" = 450'

DATE: 03/02/2018

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## ATTACHMENT A



Dewatering Calculations - Richardt's Equation  
Collins Ave. Between 65th and 69th, Miami Beach, FL

Maximum excavation/dewatering depth at bottom of duct bank is -2.8 ft City of Miami Beach Vertical Datum (MBVD).  
Groundwater elevation is +2.27 MBVD (Florida Civil, Inc., 6901 Collins Avenue, Miami Beach , FL., November 2016).  
Total head of water table aquifer (H) and hydraulic conductivity (K) obtained by Florida Civil, Inc., 6901 Collins Avenue, Miami Beach , FL., November 2016  
Conventional trench excavation width = 2.5 ft; manhole excavation width = 10.0 ft.; total excavation length = 2380 ft; estimated number of dewatering days required = 119  
Maximum daily pumpage for largest excavation dewatering demand : 164,354 gallons

Rectangular Excavation

1. Radius of Influence (m) =  $3000 \times \text{Drawdown (m)} \times \sqrt{\text{Hydraulic Conductivity } (\frac{m}{s})}$

2. Effective Radius (m) =  $\sqrt{\frac{\text{Excavation Width (m)} \times \text{Excavation Lenght (m)}}{\pi \times \text{Hydraulic Conductivity } (\frac{m}{s})}}$

3. Flow Rate (m³/s) =  $\frac{\pi \times \text{Hydraulic Conductivity } (\frac{m}{s})}{\ln \left( \frac{\text{Radius of Influence (m)}}{\text{Effective Radius (m)}} \right)}$

Excavatio n Number	GW Elevation (ft)	Exc. Bottom Elevation (ft)	Drawdown (ft)	Aquifer Head (H) (ft)	Aquifer Head (H) (m)	Dewatered Aquifer Head (h) (ft)	Dewatered Aquifer Head (h) (m)	Hydraulic Conductivity (K) (ft/day)	Hydraulic Conductivity (K) (m/s)	Radius of Influence (R <sub>o</sub> ) (ft)	Radius of Influence (R <sub>o</sub> ) (m)	Excavation Width (ft)	Excavation Width (m)	Excavation Length (ft)	Excavation Length (m)	Effective Radius (r <sub>e</sub> ) (ft)	Effective Radius (r <sub>e</sub> ) (m)	Total Radius of Influence (ft)	Total Radius of Influence (m)	Infiltration Flow Rate (gpm)	Total Daily Pumpage (gallons)
1	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
2	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
3	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
4	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
5	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
6	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
7	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
8	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
9	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
10	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
11	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
12	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
13	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
14	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
15	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
16	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
17	2.27	-1.60	3.87	220.00	67.06	216.13	65.88	28.00	0.000099	115.39	35.17	2.50	0.76	20.00	6.10	3.99	1.22	119.38	36.39	229.13	109,981
18	2.27	-2.60	4.87	220.00	67.06	215.13	65.57	28.00	0.000099	145.20	44.26	2.50	0.76	20.00	6.10	3.99	1.22	149.19	45.47	269.28	129,252
19	2.27	-2.60	4.87	220.00	67.06	215.13	65.57	28.00	0.000099	145.20	44.26	2.50	0.76	20.00	6.10	3.99	1.22	149.19	45.47	269.28	129,252
20	2.27	-2.60	4.87	220.00	67.06	215.13	65.57	28.00	0.000099	145.20	44.26	2.50	0.76	20.00	6.10	3.99	1.22	149.19	45.47	269.28	129,252
21	2.27	-2.80	5.07	220.00	67.06	214.93	65.51	28.00	0.000099	151.17	46.08	10.00	3.05	20.00	6.10	7.98	2.43	159.15	48.51	342.40	164,354
22	2.27	-2.80	5.07	220.00	67.06	214.93	65.51	28.00	0.000099	151.17	46.08	2.50	0.76	20.00	6.10	3.99	1.22	155.16	47.29	277.10	133,009
23	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
24	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
25	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
26	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
27	2.27	-0.80	3.07	220.00	67.06	216.93	66.12	28.00	0.000099	91.54	27.90	2.50	0.76	20.00	6.10	3.99	1.22	95.53	29.12	195.56	93,867
28	2.27	-1.20	3.47	220.00	67.06	216.53	66.00	28.00	0.000099	103.46	31.54	2.50	0.76	20.00	6.10	3.99	1.22	107.45	32.75	212.52	102,012
29	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
30	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
31	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
32	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
33	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
34	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
35	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
36	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
37	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
38	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
39	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
40	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
41	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
42	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
43	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
44	2.27	-2.80	5.07	220.00	67.06	214.93	65.51	28.00	0.000099	151.17	46.08	10.00	3.05	20.00	6.10	7.98	2.43	159.15	48.51	342.40	164,354
45	2.27	-2.80	5.07	220.00	67.06	214.93	65.51	28.00	0.000099	151.17	46.08	2.50	0.76	20.00	6.10	3.99	1.22	155.16	47.29	277.10	133,009
46	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
47	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
48	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721

Dewatering Calculations - Richardt's Equation  
Collins Ave. Between 65th and 69th, Miami Beach, FL

Maximum excavation/dewatering depth at bottom of duct bank is -2.8 ft City of Miami Beach Vertical Datum (MBVD).  
Groundwater elevation is +2.27 MBVD (Florida Civil, Inc., 6901 Collins Avenue, Miami Beach , FL., November 2016).  
Total head of water table aquifer (H) and hydraulic conductivity (K) obtained by Florida Civil, Inc., 6901 Collins Avenue, Miami Beach , FL., November 2016  
Conventional trench excavation width = 2.5 ft; manhole excavation width = 10.0 ft.; total excavation length = 2380 ft; estimated number of dewatering days required = 119  
Maximum daily pumpage for largest excavation dewatering demand : 164,354 gallons

Rectangular Excavation

1. Radius of Influence (m) =  $3000 \times \text{Drawdown (m)} \times \sqrt{\text{Hydraulic Conductivity } (\frac{m}{s})}$

2. Effective Radius (m) =  $\sqrt{\frac{\text{Excavation Width (m)} \times \text{Excavation Lenght (m)}}{\pi \times \text{Hydraulic Conductivity } (\frac{m}{s})}}$

3. Flow Rate ( $m^3/s$ ) =  $\frac{\pi \times \text{Hydraulic Conductivity } (\frac{m}{s})}{\ln(Radius\ of\ Influence\ (m)) - \ln(Effective\ Radius\ (m))}$

Excavatio n Number	GW Elevation (ft)	Exc. Bottom Elevation (ft)	Drawdown (ft)	Aquifer Head (H) (ft)	Aquifer Head (H) (m)	Dewatered Aquifer Head (h) (ft)	Dewatered Aquifer Head (h) (m)	Hydraulic Conductivity (K) (ft/day)	Hydraulic Conductivity (K) (m/s)	Radius of Influence (R <sub>o</sub> ) (ft)	Radius of Influence (R <sub>o</sub> ) (m)	Excavation Width (ft)	Excavation Width (m)	Excavation Length (ft)	Excavation Length (m)	Effective Radius (r <sub>e</sub> ) (ft)	Effective Radius (r <sub>e</sub> ) (m)	Total Radius of Influence (ft)	Total Radius of Influence (m)	Infiltration Flow Rate (gpm)	Total Daily Pumpage (gallons)
61	2.27	-2.20	4.47	220.00	67.06	215.53	65.69	28.00	0.000099	133.28	40.62	2.50	0.76	20.00	6.10	3.99	1.22	137.27	41.84	253.43	121,646
62	2.27	-2.20	4.47	220.00	67.06	215.53	65.69	28.00	0.000099	133.28	40.62	2.50	0.76	20.00	6.10	3.99	1.22	137.27	41.84	253.43	121,646
63	2.27	-2.20	4.47	220.00	67.06	215.53	65.69	28.00	0.000099	133.28	40.62	2.50	0.76	20.00	6.10	3.99	1.22	137.27	41.84	253.43	121,646
64	2.27	-2.20	4.47	220.00	67.06	215.53	65.69	28.00	0.000099	133.28	40.62	2.50	0.76	20.00	6.10	3.99	1.22	137.27	41.84	253.43	121,646
65	2.27	-2.20	4.47	220.00	67.06	215.53	65.69	28.00	0.000099	133.28	40.62	2.50	0.76	20.00	6.10	3.99	1.22	137.27	41.84	253.43	121,646
66	2.27	-1.80	4.07	220.00	67.06	215.93	65.82	28.00	0.000099	121.35	36.99	2.50	0.76	20.00	6.10	3.99	1.22	125.34	38.20	237.30	113,906
67	2.27	-2.60	4.87	220.00	67.06	215.13	65.57	28.00	0.000099	145.20	44.26	10.00	3.05	20.00	6.10	7.98	2.43	153.19	46.69	333.61	160,134
68	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
69	2.27	-1.20	3.47	220.00	67.06	216.53	66.00	28.00	0.000099	103.46	31.54	2.50	0.76	20.00	6.10	3.99	1.22	107.45	32.75	212.52	102,012
70	2.27	-2.20	4.47	220.00	67.06	215.53	65.69	28.00	0.000099	133.28	40.62	2.50	0.76	20.00	6.10	3.99	1.22	137.27	41.84	253.43	121,646
71	2.27	-2.20	4.47	220.00	67.06	215.53	65.69	28.00	0.000099	133.28	40.62	2.50	0.76	20.00	6.10	3.99	1.22	137.27	41.84	253.43	121,646
72	2.27	-1.80	4.07	220.00	67.06	215.93	65.82	28.00	0.000099	121.35	36.99	2.50	0.76	20.00	6.10	3.99	1.22	125.34	38.20	237.30	113,906
73	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
74	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
75	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
76	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
77	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
78	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
79	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
80	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
81	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
82	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
83	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
84	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
85	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
86	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
87	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
88	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
89	2.27	-2.60	4.87	220.00	67.06	215.13	65.57	28.00	0.000099	145.20	44.26	10.00	3.05	20.00	6.10	7.98	2.43	153.19	46.69	333.61	160,134
90	2.27	-2.60	4.87	220.00	67.06	215.13	65.57	28.00	0.000099	145.20	44.26	2.50	0.76	20.00	6.10	3.99	1.22	149.19	45.47	269.28	129,252
91	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
92	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
93	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
94	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
95	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
96	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
97	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
98	2.27	-0.60	2.87	220.00	67.06	217.13	66.18	28.00	0.000099	85.57	26.08	2.50	0.76	20.00	6.10	3.99	1.22	89.56	27.30	186.92	89,721
99	2.27	-1.20	3.47	220.00	67.06	216.53	66.00	28.00	0.000099	103.46	31.54	2.50	0.76	20.00	6.10	3.99	1.22	107.45	32.75	212.52	102,012



Dewatering Calculations - Sichardt's Equation  
Collins Ave. Between 65th and 69th, Miami Beach, FL

Maximum excavation/dewatering depth at bottom of duct bank is -2.8 ft City of Miami Beach Vertical Datum (MBVD).  
Groundwater elevation is +2.27 MBVD (Florida Civil, Inc., 6901 Collins Avenue, Miami Beach , FL., November 2016).  
Total head of water table aquifer (H) and hydraulic conductivity (K) obtained by Florida Civil, Inc., 6901 Collins Avenue, Miami Beach , FL., November 2016  
Conventional trench excavation width = 2.5 ft; manhole excavation width = 10.0 ft.; total excavation length = 2380 ft; estimated number of dewatering days required = 119  
Maximum daily pumpage for largest excavation dewatering demand : 164,354 gallons

Rectangular Excavation

1. Radius of Influence (m) = 3000 × Drawdown (m) × √Hydraulic Conductivity (m/s)

2. Effective Radius (m) = √(Excavation Width (m) × Excavation Lenght (m) / (π × Hydraulic Conductivity (m/s)))

3. Flow Rate (m³/s) = [Ln (Radius of Influence (m)) – Ln(Effective Radius (m))] ×

Excavatio n Number	GW Elevation (ft)	Exc. Bottom Elevation (ft)	Drawdown (ft)	Aquifer Head (H) (ft)	Aquifer Head (H) (m)	Dewatered Aquifer Head (h) (ft)	Dewatered Aquifer Head (h) (m)	Hydraulic Conductivity (K) (ft/day)	Hydraulic Conductivity (K) (m/s)	Radius of Influence (R <sub>o</sub> ) (ft)	Radius of Influence (R <sub>o</sub> ) (m)	Excavation Width (ft)	Excavation Width (m)	Excavation Length (ft)	Excavation Length (m)	Effective Radius (r <sub>e</sub> ) (ft)	Effective Radius (r <sub>e</sub> ) (m)	Total Radius of Influence (ft)	Total Radius of Influence (m)	Infiltration Flow Rate (gpm)	Total Daily Pumpage (gallons)
100	2.27	-2.40	4.67	220.00	67.06	215.33	65.63	28.00	0.000099	139.24	42.44	2.50	0.76	20.00	6.10	3.99	1.22	143.23	43.66	261.39	125,465
101	2.27	-2.40	4.67	220.00	67.06	215.33	65.63	28.00	0.000099	139.24	42.44	2.50	0.76	20.00	6.10	3.99	1.22	143.23	43.66	261.39	125,465
102	2.27	-2.40	4.67	220.00	67.06	215.33	65.63	28.00	0.000099	139.24	42.44	2.50	0.76	20.00	6.10	3.99	1.22	143.23	43.66	261.39	125,465
103	2.27	-2.40	4.67	220.00	67.06	215.33	65.63	28.00	0.000099	139.24	42.44	2.50	0.76	20.00	6.10	3.99	1.22	143.23	43.66	261.39	125,465
104	2.27	-2.40	4.67	220.00	67.06	215.33	65.63	28.00	0.000099	139.24	42.44	2.50	0.76	20.00	6.10	3.99	1.22	143.23	43.66	261.39	125,465
105	2.27	-2.40	4.67	220.00	67.06	215.33	65.63	28.00	0.000099	139.24	42.44	2.50	0.76	20.00	6.10	3.99	1.22	143.23	43.66	261.39	125,465
106	2.27	-2.40	4.67	220.00	67.06	215.33	65.63	28.00	0.000099	139.24	42.44	2.50	0.76	20.00	6.10	3.99	1.22	143.23	43.66	261.39	125,465
107	2.27	-2.40	4.67	220.00	67.06	215.33	65.63	28.00	0.000099	139.24	42.44	2.50	0.76	20.00	6.10	3.99	1.22	143.23	43.66	261.39	125,465
108	2.27	-2.40	4.67	220.00	67.06	215.33	65.63	28.00	0.000099	139.24	42.44	2.50	0.76	20.00	6.10	3.99	1.22	143.23	43.66	261.39	125,465
111	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
112	2.27	-1.40	3.67	220.00	67.06	216.33	65.94	28.00	0.000099	109.43	33.35	2.50	0.76	20.00	6.10	3.99	1.22	113.42	34.57	220.87	106,017
113	2.27	-0.30	2.57	220.00	67.06	217.43	66.27	28.00	0.000099	76.63	23.36	2.50	0.76	20.00	6.10	3.99	1.22	80.62	24.57	173.75	83,402
114	2.27	-1.00	3.27	220.00	67.06	216.73	66.06	28.00	0.000099	97.50	29.72	2.50	0.76	20.00	6.10	3.99	1.22	101.49	30.93	204.09	97,963
115	2.27	-2.40	4.67	220.00	67.06	215.33	65.63	28.00	0.000099	139.24	42.44	2.50	0.76	20.00	6.10	3.99	1.22	143.23	43.66	261.39	125,465
116	2.27	0.90	1.37	220.00	67.06	218.63	66.64	28.00	0.000099	40.85	12.45	2.50	0.76	20.00	6.10	3.99	1.22	44.84	13.67	118.00	56,639
117	2.27	0.40	1.87	220.00	67.06	218.13	66.49	28.00	0.000099	55.76	16.99	2.50	0.76	20.00	6.10	3.99	1.22	59.75	18.21	141.90	68,111
118	2.27	0.90	1.37	220.00	67.06	218.63	66.64	28.00	0.000099	40.85	12.45	2.50	0.76	20.00	6.10	3.99	1.22	44.84	13.67	118.00	56,639
																		TOTAL PUMPAGE (GALLONS) =		12,200,026	

Blue Text: Manhole Excavation Segment

Reviewed and Approved by:

Robert L. Vinson III  
Digitally signed by Robert L. Vinson III  
Date: 2018.05.11 19:25:32 +09'00'

Robert L. Vinson III, P.E.  
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Infiltration Calculations  
Collins Ave, Between 65th and 69th, Miami Beach, FL

SFWMD Permit Application Manual, Volume IV, FDOT Drainage  
Handbook Exfiltration Systems 2007

NOTE:

- (1) This method calculates the required length of infiltration trench based on one-hour of infiltration. Therefore, the volume used in this equation is the sum of the initial open hole water volume and the dewatering effluent generated in one hour.  
(2) Existing grade elevations per National Geodetic Vertical Datum of 1929 (NGVD).  
(3) Use L2 when saturated depth of trench is greater than non-saturated depth or the trench width is greater than 2 times trench depth

1. Radius of Influence (m) =  $3000 \times \text{Drawdown (m)} \times \sqrt{\text{Hydraulic Conductivity } (\frac{m}{s})}$

2. Effective Radius (m) =  $\frac{\sqrt{\text{Excavation Width (m)} \times \text{Excavation Length (m)}}}{\pi}$

3. Flow Rate (m³/s) =  $\frac{\pi \times \text{Hydraulic Conductivity } (\frac{m}{s})}{\ln(\text{Radius of Influence (m)}) - \ln(\text{Effective Radius (m)})}$

$$L = \frac{V}{K(H_2W + 2H_2D_U - D_U^2 + 2H_2D_S) + (1.39 \times 10^{-4})WD_U}$$

$$L_2 = \frac{V}{K(2H_{eff}D_U - D_U^2 + 2H_{eff}D_S) + (1.39 \times 10^{-4})WD_U}$$

L = Length of Trench (feet)  
V = Volume Treated (acre – inches)  
W = Trench Width (feet)  
K = Hydraulic Conductivity (cfs/ft² – ft head)  
H₂ = H<sub>eff</sub> = Depth to Water Table (feet)  
D<sub>U</sub> = Non – Saturated Trench Depth (feet)  
D<sub>S</sub> = Saturated Trench Depth (feet)

Excavation Number	GW Elevation (ft)	Depth to GW (ft)	Exc. Bottom Elevation (ft)	Exc. Bottom from Surface (ft)	Non Saturated Trench Depth (ft)	Saturated Trench Depth (ft)	Hydraulic Conductivity (K) (ft/day)	Hydraulic Conductivity (K) (m/s)	Hydraulic Conductivity (K) (cfs/ft²-ft head)	Excavation Width (ft)	Excavation Width (m)	Excavation Length (ft)	Excavation Length (m)	Infiltration Flow Rate (gpm)	Total Hourly Pumpage (gallons)	Total Hourly Pumpage (acre-in)	Minimum Trench Length L (ft)	Minimum Trench Length L₂ (ft)	Minimum Trench Length (ft)
1	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
2	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
3	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
4	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
5	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
6	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
7	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
8	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
9	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
10	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
11	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
12	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
13	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
14	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
15	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
16	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
17	2.27	4.93	-1.60	8.80	4.93	3.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	229.1	13747.6	0.51	19.51	19.98	20
18	2.27	4.93	-2.60	9.80	4.93	4.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	269.3	16156.6	0.60	20.42	23.48	24
19	2.27	4.93	-2.60	9.80	4.93	4.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	269.3	16156.6	0.60	20.42	23.48	24
20	2.27	4.93	-2.60	9.80	4.93	4.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	269.3	16156.6	0.60	20.42	23.48	24
21	2.27	4.93	-2.80	10.00	4.93	5.07	28.00	0.000099	0.000324	10.00	3.05	20.00	6.10	342.4	20544.2	0.76	16.13	24.82	25
22	2.27	4.93	-2.80	10.00	4.93	5.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	277.1	16626.2	0.61	20.56	24.16	25
23	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
24	2.27	7.20	-0.80	10.27	7.20	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	10.95	8.17	11
25	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
26	2.27	4.93	-0.80	8.00	4.93	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	18.47	17.05	19
27	2.27	5.13	-0.80	8.20	5.13	3.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	195.6	11733.4	0.43	17.51	15.79	18
28	2.27	5.13	-1.20	8.60	5.13	3.47	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	212.5	12751.5	0.47	18.06	17.16	19
29	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
30	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
31	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
32	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
33	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
34	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
35	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
36	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
37	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
38	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
39	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
40	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
41	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
42	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
43	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
44	2.27	5.13	-2.80	10.20	5.13	5.07	28.00	0.000099	0.000324	10.00	3.05	20.00	6.10	342.4	20544.2	0.76	15.40	23.13	24

Infiltration Calculations  
Collins Ave, Between 65th and 69th, Miami Beach, FL

1. Radius of Influence (m) =  $3000 \times \text{Drawdown (m)} \times \sqrt{\text{Hydraulic Conductivity } (\frac{m}{s})}$

2. Effective Radius (m) =  $\sqrt{\frac{\text{Excavation Width (m)} \times \text{Excavation Lenght (m)}}{\pi}}$

3. Flow Rate (m³/s) =  $\frac{\pi \times \text{Hydraulic Conductivity } (\frac{m}{s})}{\ln(\text{Radius of Influence (m)}) - \ln(\text{Effective Radius (m)})}$

V = Volume Treated (acre – inches)  
W = Trench Width (feet)  
K = Hydraulic Conductivity (cfs/ft² – ft head)  
H<sub>2</sub> = H<sub>eff</sub> = Depth to Water Table (feet)  
D<sub>U</sub> = Non – Saturated Trench Depth (feet)  
D<sub>S</sub> = Saturated Trench Depth (feet)

Excavation Number	GW Elevation (ft)	Depth to GW (ft)	Exc. Bottom Elevation (ft)	Exc. Bottom from Surface (ft)	Non Saturated Trench Depth (ft)	Saturated Trench Depth (ft)	Hydraulic Conductivity (K) (ft/day)	Hydraulic Conductivity (K) (m/s)	Hydraulic Conductivity (K) (cfs/ft2-ft head)	Excavation Width (ft)	Excavation Width (m)	Excavation Length (ft)	Excavation Length (m)	Infiltration Flow Rate (gpm)	Total Hourly Pumpage (gallons)	Total Hourly Pumpage (acre-in)	Minimum Trench Length L (ft)	Minimum Trench Length L <sub>2</sub> (ft)	Minimum Trench Length (ft)
45	2.27	5.13	-2.80	10.20	5.13	5.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	277.1	16626.2	0.61	19.55	22.37	23
46	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
47	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
48	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
61	2.27	5.13	-2.20	9.60	5.13	4.47	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	253.4	15205.7	0.56	19.09	20.46	21
62	2.27	5.13	-2.20	9.60	5.13	4.47	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	253.4	15205.7	0.56	19.09	20.46	21
63	2.27	5.13	-2.20	9.60	5.13	4.47	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	253.4	15205.7	0.56	19.09	20.46	21
64	2.27	5.13	-2.20	9.60	5.13	4.47	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	253.4	15205.7	0.56	19.09	20.46	21
65	2.27	5.13	-2.20	9.60	5.13	4.47	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	253.4	15205.7	0.56	19.09	20.46	21
66	2.27	5.13	-1.80	9.20	5.13	4.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	237.3	14238.2	0.52	18.73	19.16	20
67	2.27	5.13	-2.60	10.00	5.13	4.87	28.00	0.000099	0.000324	10.00	3.05	20.00	6.10	333.6	20016.8	0.74	15.21	22.53	23
68	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
69	2.27	5.13	-1.20	8.60	5.13	3.47	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	212.5	12751.5	0.47	18.06	17.16	19
70	2.27	5.13	-2.20	9.60	5.13	4.47	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	253.4	15205.7	0.56	19.09	20.46	21
71	2.27	5.13	-2.20	9.60	5.13	4.47	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	253.4	15205.7	0.56	19.09	20.46	21
72	2.27	5.13	-1.80	9.20	5.13	4.07	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	237.3	14238.2	0.52	18.73	19.16	20
73	2.27	5.13	-1.40	8.80	5.13	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	18.30	17.83	19
74	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
75	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
76	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
77	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
78	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
79	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
80	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
81	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
82	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
83	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
84	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
85	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
86	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
87	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
88	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
89	2.27	5.13	-2.60	10.00	5.13	4.87	28.00	0.000099	0.000324	10.00	3.05	20.00	6.10	333.6	20016.8	0.74	15.21	22.53	23
90	2.27	5.13	-2.60	10.00	5.13	4.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	269.3	16156.6	0.60	19.41	21.74	22
91	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
92	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
93	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
94	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
95	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
96	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
97	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18
98	2.27	5.13	-0.60	8.00	5.13	2.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	186.9	11215.1	0.41	17.20	15.09	18

Infiltration Calculations  
Collins Ave, Between 65th and 69th, Miami Beach, FL

1. Radius of Influence (m) =  $3000 \times \text{Drawdown (m)} \times \sqrt{\text{Hydraulic Conductivity } (\frac{m}{s})}$

2. Effective Radius (m) =  $\sqrt{\frac{\text{Excavation Width (m)} \times \text{Excavation Length (m)}}{\pi}}$

3. Flow Rate (m³/s) =  $\frac{\pi \times \text{Hydraulic Conductivity } (\frac{m}{s})}{\ln(\text{Radius of Influence (m)}) - \ln(\text{Effective Radius (m)})}$

V = Volume Treated (acre – inches)  
W = Trench Width (feet)  
K = Hydraulic Conductivity (cfs/ft² – ft head)  
H<sub>2</sub> = H<sub>eff</sub> = Depth to Water Table (feet)  
D<sub>U</sub> = Non – Saturated Trench Depth (feet)  
D<sub>S</sub> = Saturated Trench Depth (feet)

Excavation Number	GW Elevation (ft)	Depth to GW (ft)	Exc. Bottom Elevation (ft)	Exc. Bottom from Surface (ft)	Non Saturated Trench Depth (ft)	Saturated Trench Depth (ft)	Hydraulic Conductivity (K) (ft/day)	Hydraulic Conductivity (K) (m/s)	Hydraulic Conductivity (K) (cfs/ft2-ft head)	Excavation Width (ft)	Excavation Width (m)	Excavation Length (ft)	Excavation Length (m)	Infiltration Flow Rate (gpm)	Total Hourly Pumpage (gallons)	Total Hourly Pumpage (acre-in)	Minimum Trench Length L (ft)	Minimum Trench Length L <sub>2</sub> (ft)	Minimum Trench Length (ft)
99	2.27	5.13	-1.20	8.60	5.13	3.47	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	212.5	12751.5	0.47	18.06	17.16	19
100	2.27	5.13	-2.40	9.80	5.13	4.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	261.4	15683.1	0.58	19.26	21.10	22
101	2.27	5.13	-2.40	9.80	5.13	4.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	261.4	15683.1	0.58	19.26	21.10	22
102	2.27	5.13	-2.40	9.80	5.13	4.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	261.4	15683.1	0.58	19.26	21.10	22
103	2.27	5.13	-2.40	9.80	5.13	4.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	261.4	15683.1	0.58	19.26	21.10	22
104	2.27	5.13	-2.40	9.80	5.13	4.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	261.4	15683.1	0.58	19.26	21.10	22
105	2.27	5.13	-2.40	9.80	5.13	4.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	261.4	15683.1	0.58	19.26	21.10	22
106	2.27	5.13	-2.40	9.80	5.13	4.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	261.4	15683.1	0.58	19.26	21.10	22
107	2.27	5.13	-2.40	9.80	5.13	4.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	261.4	15683.1	0.58	19.26	21.10	22
108	2.27	5.13	-2.40	9.80	5.13	4.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	261.4	15683.1	0.58	19.26	21.10	22
111	2.27	4.53	-1.40	8.20	4.53	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	21.53	22.67	23
112	2.27	4.53	-1.40	8.20	4.53	3.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	220.9	13252.1	0.49	21.53	22.67	23
113	2.27	4.53	-0.30	7.10	4.53	2.57	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	173.8	10425.2	0.38	19.75	17.84	20
114	2.27	4.53	-1.00	7.80	4.53	3.27	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	204.1	12245.3	0.45	20.98	20.95	21
115	2.27	4.53	-2.40	9.20	4.53	4.67	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	261.4	15683.1	0.58	22.56	26.83	27
116	2.27	5.33	0.90	6.70	5.33	1.37	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	118.0	7079.9	0.26	12.97	8.85	13
117	2.27	5.33	0.40	7.20	5.33	1.87	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	141.9	8513.9	0.31	14.36	10.64	15
118	2.27	5.33	0.90	6.70	5.33	1.37	28.00	0.000099	0.000324	2.50	0.76	20.00	6.10	118.0	7079.9	0.26	12.97	8.85	13

Reviewed and Approved by:

Robert L. Vinson III  
Digitally signed by Robert L. Vinson III  
Date: 2018.05.11 19:23:23 +09'00'  
Robert L. Vinson III, P.E.  
License No. 53438

This item has been digitally signed and sealed by Robert L. Vinson III, PE #53438 on 11 May 2018 using a digital seal. Printed copies of this document are not considered signed and sealed and the SHA authentication code

# **Manual Estimation of the Dewatering Radius of Influence (Sichardt's Equation) & Maximum Dewatering Volumes (Daily Pumpage)**

**Project Site:** FPL Duct Bank -Collins Avenue between 65th and 69th St. - WR# 7766980

**Location:** Miami Beach, Miami-Dade County, Florida

## **Summary of Plan Details:**

Ground surface elevation at the proposed dewatering site varies with a maximum elevation of +7.6 feet relative to the Miami Beach Vertical Datum (MBVD). Average groundwater elevation at the proposed dewatering site is +2.27 feet MBVD; and the maximum bottom elevation of the excavations is -2.80 feet MBVD.

Dewatering fluids will be pumped from one excavation trench to a 20,000-gallon mobile weir tank adjacent to the excavation, using a self-priming six-inch (6") trash pump, or equivalent, then to another segment of the excavation to be utilized for infiltration purposes (trench-to-trench method) within the FDOT right-of-way. Calculations of infiltration trench size requirements are provided in **Attachment A**.

In the event that the trench to trench method does not provide sufficient infiltration, dewatering fluids will be directed from the 20,000-gallon sedimentation weir tank using a self-priming six-inch (6") trash pump, or equivalent, to temporary shallow 24" diameter drainage wells to be installed within the FDOT right-of-way. The placement of these temporary drainage wells will be strategically located to minimize the "short circuiting" of active trench dewatering. The total well depth will not exceed 40 feet bgs, with steel casing to 35 feet bgs. The proposed locations of the temporary shallow drainage wells are shown in **Figure 2**.

Dewatering fluids discharged to these drainage wells will be treated through a 20,000-gallon sedimentation weir tank and monitored for turbidity. Monitoring will comply with Section 24-44.2(3) of the Code of Miami-Dade County. Dewatering assumptions are based on the time required to dig, dewater, form and cast duct bank and install manholes during daylight working hours.

Dewatering duration for duct bank installation is estimated at eight (8) hours per day for one hundred and nineteen (119) working days. Pump and sedimentation tank specification data is included as **Attachment C**.

Variable	Value	US units	Value	Metric Units
Hydraulic Conductivity (k)	28	feet/day	0.000099	meters/second
Aquifer Thickness (H)	220	feet	67.06	meters
Depth to Water	4.93	feet	1.50	meters
Excavation Depth	10	feet	3.05	meters
Open Trench Length (a)	20	feet	6.10	meters
Open Trench Width (b)	10	feet	3.05	meters
$\pi$	3.14		3.14	
Number of Extraction Points (n)	1		1	
Pumping Time per day	480	minutes	480	minutes

## **Example Calculation**

### **A. Calculation of Radius of Influence ( $R_0$ ) for an open hole**

$$R_0 = 3000 \cdot (H-h) \cdot \sqrt{k}$$

$h = H - (\text{Excavation Depth} - \text{Depth to Water}) =$	65.51	meters
$H - h =$	1.55	meters
Radius of Influence ( $R_0$ ) =	46.08	meters

### **B. Calculation of the Effective Radius ( $R_e$ ) for rectangular excavation area adjustment**

$$r_e = \sqrt{(a \cdot b) / \pi}$$

$r_e =$	2.43	meters
---------	------	--------

### **C. Calculation of the Maximum Total Influence ( $R_0 + R_e$ )**

Maximum Total Influence = Radius of influence (A.) + Effective radius of rectangular excavation dimensions (B.)

Maximum Radius of Influence =	48.51	meters
	159.15	feet

**D. Dewatering Pump Rate (q) per Extraction Point (n = 1)**

$$H^2 - h^2 = (n \cdot q / \pi \cdot k) (\ln R_0 - \ln r_e)$$

$h = H - (\text{Excavation Depth} - \text{Depth to Water})$	65.51	meters
$H^2 - h^2$	204.86	square meters
$\pi \cdot k$	0.000310162	meters/second
$\ln R_0 - \ln r_e$	2.94	
$(H^2 - h^2) / (\ln R_0 - \ln r_e)$	69.65	
$q = ((H^2 - h^2) \cdot \pi k) / ((\ln R_0 - \ln r_e) \cdot n)$	0.0216	meters <sup>3</sup> /second
$q = ((H^2 - h^2) \cdot \pi k) / ((\ln R_0 - \ln r_e) \cdot n)$	342.40	US gallons/minute
Maximum Daily Pumpage for largest excavation dewatering demand (q x pumping time) =	164,354	US gallons/day

*The calculations presented are deemed appropriate and in accordance with State of Florida Rules and Regulation as certified by a registered Professional Engineer authorized by Chapter 471, Florida Statutes and defined by the Florida State Board of Professional Engineering. To the best of my knowledge, all information summarized in this report is true, accurate, complete, and in accordance with applicable Miami-Dade County Chapter 24 Code provisions and the State of Florida Rules and Regulations.*

Reviewed and Approved by:

**Robert L. Vinson III**  
 Digitally signed by Robert L. Vinson III  
 Date: 2018.05.11 19:43:35 +09'00'  
 Robert L. Vinson III, P.E.  
 License No. 53438

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# **L'ATELIER** **6901 COLLINS AVE,** **MIAMI BEACH, FL 33141**

## **INDEX OF DRAWINGS:**

- CDP-0.0 COVER SHEET
- CDP-1.0 CONSTRUCTION DEWATERING PLAN
- CDP-2.0 DEWATERED SECTION
- CDP-3.0 CALCULATIONS
- CDP-4.0 CONTAMINATED SITE SURVEY

## **ATTACHED SHEETS:**

- SWPPP 1-3

## **REFERENCE DATUM:**

- ☒ NATIONAL GEODETIC VERTICAL DATUM OF 1929
- ☐ NORTH AMERICAN VERTICAL DATUM OF 1988

## **GENERAL NOTES:**

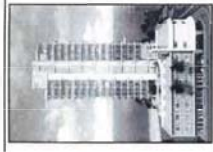
- THIS DRAWING REPRESENTS THE CONTRACTOR'S INTENDED MEANS AND METHODS AND SHALL BE USED FOR OBTAINING APPLICABLE AGENCY APPROVALS FOR GROUNDWATER DEWATERING. NO OTHER PURPOSE IMPLIED.
- DEWATERING ACTIVITIES SHALL ADHERE TO THE CONDITIONS AND PROVISIONS OUTLINED IN THE ASSOCIATED PERMITS AND APPROVALS ISSUED FOR THIS PROJECT.
- LOCATIONS OF PROPOSED STRUCTURES ARE APPROXIMATED USING UNDERLAY, SIGNIFICANT ERROR MAY EXIST.
- EXCAVATION AND DEWATERING IN THE IMMEDIATE VICINITY OF EXISTING STRUCTURES AND UTILITIES REQUIRES SPECIFIC FOUNDATION REINFORCEMENT AND/OR SOIL IMPROVEMENTS IN ORDER TO PROTECT THE INTEGRITY OF EXISTING STRUCTURES AND PROVIDE A SAFE WORKING ENVIRONMENT. THE CONTRACTOR SHALL CONSULT THE ENGINEER OF RECORD REGARDING APPROVED DESIGN FOR MEANS AND METHODS OF PROTECTING THIS AND ANY RELATED EXISTING STRUCTURES (REF OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) SECTION 1926.651(i)). DESIGN PLANS FOR ANY REQUIRED SOIL IMPROVEMENT PROCEDURES, SHORING OR FOUNDATION IMPROVEMENTS ARE NOT INCLUDED HEREIN.
- SEASONAL AND WEATHER VARIATIONS SHOULD BE EXPECTED.
- CONTRACTOR SHALL EXCAVATE IN ACCORDANCE WITH OSHA REQUIREMENTS (REF-SECTION 1926.650). TRENCH SAFETY PLAN BY OTHERS.
- STRUCTURAL INFORMATION WAS OBTAINED FROM THE STRUCTURAL PLANS PREPARED BY DE LOS REYES ENGINEERING, INC, DATED 05/16/06. REFER TO CONSTRUCTION DRAWINGS FOR REFERENCE.
- PROPOSED DRAINAGE INFORMATION WAS OBTAINED FROM THE CIVIL PLANS PREPARED BY VSN ENGINEERING, INC, DATED 05/10/07. REFER TO CONSTRUCTION DRAWINGS FOR REFERENCE.



## **PROPERTY INFORMATION**

### **MIAMI-DADE COUNTY PROPERTY APPRAISER:**

**FOLIOS:** C02-3211-001-0050  
**OWNER:** SMGW GOLDEN SANDS LLC  
**MAILING ADDRESS:** 3180 STIRLING RD  
 HOLLYWOOD, FL 33021  
**PROJECT ACREAGE:** 0.92



No.	Revision/Issue	Date

**FLORIDA CIVIL ENGINEERING, INC.**  
 970 WEST MEADE RD, SUITE 210  
 FT. LAUDERDALE, FL 33309  
 754.222.9259  
 engineering@florida-civil.com  
 FL C.E. 28846

**PROJECT NAME:**  
**L'ATELIER**  
 6901 COLLINS AVE,  
 MIAMI BEACH, FL 33141

**OWNER:**  
**SMGW GOLDEN SANDS LLC**  
 3180 STIRLING ROAD  
 HOLLYWOOD, FL 33021

**PREPARED FOR (CONTRACTOR):**  
**G.T. McDONALD ENTERPRISES**  
 General Contractor  
 400 S. STATE ROAD 7  
 PLANTATION, FL 33321

**COVER SHEET**

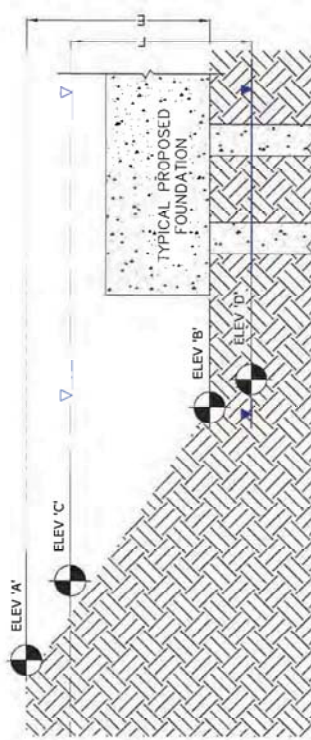


**MATTHEW S. MILINSKI, PE**  
 LICENSE # 58704

Project	Sheet
16090	11.01.16
SEE GRAPHIC	Checked by: A.G.
Drawn by: M.T.	

# **CONSTRUCTION DEWATERING PLAN** **L'ATELIER**



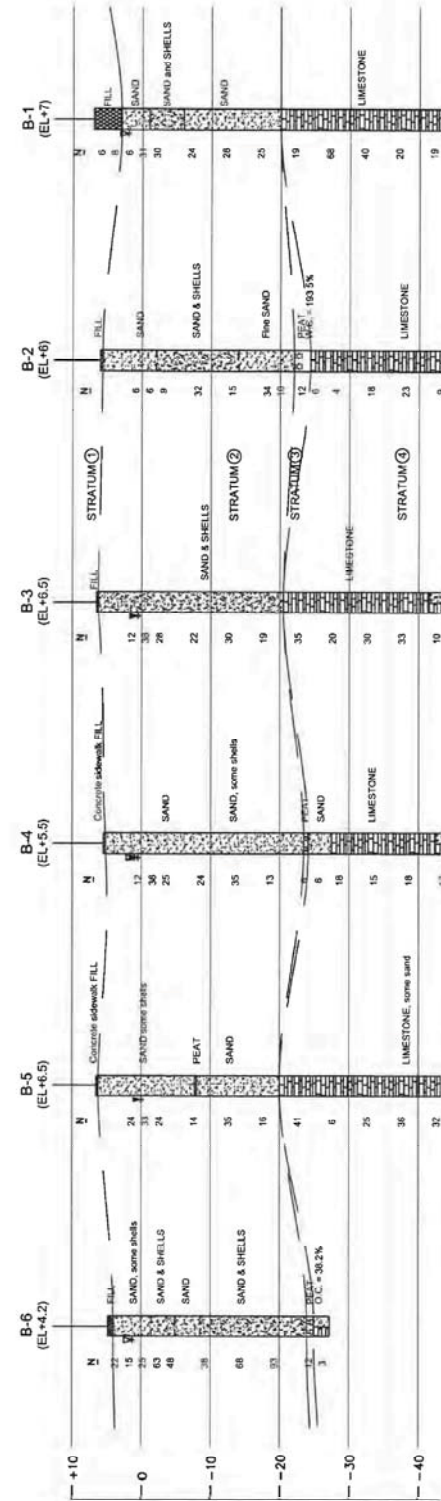


**A** TYPICAL DEWATERED SECTION A-A

N-T-S

ITEM	DESCRIPTION	FT
ELEV A	Average Grade Elevation (+/-)	6.50 NGVD
ELEV B	Deepest Excavation Elevation	-2.20 NGVD
E	Max Depth of Excavation (A - B)	8.70 FT
ELEV C	Natural Water Table Elevation	2.50 NGVD
ELEV D	Deepest Dewatered Elevation	-3.20 NGVD
F	Maximum Drawdown (C - D)	5.70 FT

**DEWATERED INFORMATION**



**GEOTECHNICAL INFORMATION NGVD**

1. GEOTECHNICAL SUMMARY OBTAINED FROM GEOTECHNICAL REPORT PREPARED BY LANGAN FOR THE L'ATELIER PROJECT, DATED 04/10/15. ANY ADDITIONAL INFORMATION MAY BE FOUND THEREIN.

**DEWATERED SECTION**

**FLORIDA CIVIL**

970 WEST MCNAB RD, SUITE 210  
FT. LAUDERDALE, FL 33309  
754.222.9359  
engineering@florida-civil.com  
FL C.A. 29946

**PROJECT NAME:**  
L'ATELIER  
6901 COLLINS AVE,  
MIAMI BEACH, FL 33141

**OWNER:**  
SMGW GOLDEN  
SANDS LLC  
3180 COLLINS AVE  
HOUSTON, TX 77056  
HOLLYWOOD, FL 33021

**PREPARED FOR (CONTRACTOR):**  
**G.T. McDONALD ENTERPRISES**  
General Contractor  
400 S. STATE ROAD 7  
PLANTATION, FL 33321

**DEWATERED SECTION**

**Project:** 16090  
**Date:** 1.01.16  
**Scale:** SEE GRAPHIC  
**Drawn by:** M.T.  
**Checked by:** A.G.

**CDP-2.0**

**Matthew S. Milinski, P.E.**  
License # 58704  
Professional Engineer  
State of Florida



Hydraulic Conductivity (K): MS  
FT/DAY 28 9.88E-05

Aquifer Thickness (H):<sup>2</sup>  
H (ft) 220 H (m) 67.05

FLORIDACIVIL  
970 WEST MCNAB RD, SUITE 210  
FT. LAUDERDALE, FL 33309  
954-350-3500  
eng@floridacivil.com  
FL C.A. 25546

PROJECT NAME:  
L'ATELIER  
6901 COLLINS AVE,  
MIAMI BEACH, FL 33141

OWNER:  
SMGW GOLDEN  
SANDS LLC  
3180 STIRLING ROAD  
HOLLYWOOD, FL 33021

PREPARED FOR  
G.T. McDONALD  
ENTERPRISES  
13000 BUCKINGHAM  
400 S. STATE ROAD 7  
PLANTATION, FL 33321

No. Revision/Issue Date

Project 1609010  
Date 11.01.16  
Sheet SEE GRAPHIC  
Drawn By M.T. Checked By A.G.

Project 1609010  
Date 11.01.16  
Sheet SEE GRAPHIC  
Drawn By M.T. Checked By A.G.

1.0 Determine Mean Normal Velocity in Tank, Vm.

Flowrate: 925 gpm max  
Dimensions of tank\* (ft): 20 8 8  
Volume of tank: 10,000 gal  
(inconsistent cross section results in lesser volume)  
Mean normal velocity Vm: 35.8 E-3 ft / sec  
\*Based on actual depth of water  
\*\* Steady state flowrate.

2.0 Determine Settling Velocity, Vs

Vs = [g x (SG - 1) x d<sup>2</sup>] / (18 x v)  
g = 32.2 ft / sec<sup>2</sup>  
SG = 2.65  
d = 3.61E-04 ft  
V = 9.26E-06 ft<sup>2</sup>/sec

3.0 Conclusion.  
Vm < Vs  
TRUE

SEDIMENTATION CALCULATIONS

Section	Description	G.W. Elev. <sup>3</sup>	Excavation Dimensions Width ft	Excavation Length ft	Lowest Excavate Elev.	Dewatered Elev.	Draw-down H-h ft	Draw-down H-h m	Radius of Influence R ft	Effective Well Rad. Re m	Total Rad. Influence R <sub>T</sub> m	Estimated Rad. Influence R <sub>T</sub> ft
ZONE 1	SHALLOW FOUNDATIONS	2.50	40	68	1.47	0.47	2.03	0.62	18.45	9.0	27.4	90
ZONE 2	DEEP FOUNDATION 22PC	2.50	55	63	0.97	-0.03	2.53	0.77	22.99	10.1	33.1	109
ZONE 3	DEEP FOUNDATION 6PC	2.50	73	38	-2.03	-3.03	5.53	1.69	50.25	9.1	59.3	195
ZONE 4	DEEP FOUNDATION 49PC	2.50	97	81	-2.20	-3.20	5.70	1.74	51.80	15.2	67.0	220
ZONE 5	DEEP FOUNDATION 15PC	2.50	78	77	-1.70	-2.70	5.20	1.58	47.25	13.3	60.6	199
ZONE 6	DEEP FOUNDATION 15PC	2.50	78	47	-2.03	-3.03	5.53	1.69	50.25	10.4	60.7	199

Section	Description	Lowest Excavate Elev. ft	Est. Radial Flowrate Q m <sup>3</sup> /s	Est. Radial Flowrate Q gpm	Flowrate Adjustment Q gpm	Calculated Flow Rate <sup>4</sup> Q gpm
ZONE 1	SHALLOW FOUNDATIONS	1.47	83	0.036	563	563
ZONE 2	DEEP FOUNDATION 22PC	0.97	103	0.039	617	617
ZONE 3	DEEP FOUNDATION 6PC	-2.03	223	0.040	641	641
ZONE 4	DEEP FOUNDATION 49PC	-2.20	230	0.058	925	925
ZONE 5	DEEP FOUNDATION 15PC	-1.70	210	0.052	816	816
ZONE 6	DEEP FOUNDATION 15PC	-2.03	223	0.044	697	697

Section	Description	Flowrate Q gpm	Pumping Time hr/day	Pumping Time min/day	Daily Pumpage MGD	Estimated Days of Pumping	Estimated Tot. Pumpage MG
ZONE 1	SHALLOW FOUNDATIONS	563	24	1440	0.8	14	11.36
ZONE 2	DEEP FOUNDATION 22PC	617	24	1440	0.9	14	12.43
ZONE 3	DEEP FOUNDATION 6PC	641	24	1440	0.9	10	9.23
ZONE 4	DEEP FOUNDATION 49PC	925	24	1440	1.3	21	27.96
ZONE 5	DEEP FOUNDATION 15PC	816	24	1440	1.2	14	16.45
ZONE 6	DEEP FOUNDATION 15PC	697	24	1440	1.0	14	14.06
AVERAGE		710			1.332		91.49
MAX							

NOTES:

1. K obtained from April 10, 2015 Geotechnical Report prepared by LANGAN for the 6901 Collins Avenue project.
2. H obtained from USGS Map.
3. See Sheet CDP-0.0 for reference datum.
4. Flowrates may vary significantly due to unforeseen and heterogeneous subsurface conditions, fluctuations in water table elevation, seasonal and weather conditions.

FLOW SUMMARY

Average pumpage (gal / min) = 710  
Maximum daily pumpage (MGD) = 1.3316  
Estimated Project Pumpage, in Millions of Gallons: 91.5  
Total days of pumping (est.) 87

DEWATERING CALCULATIONS

CALCULATIONS

## ATTACHMENT B



## FDEP Scoring Review

Deliverable Date: January 16, 2009

FacilityID: 139501511

Latitude: 25° 50' 54.4272" N

Longitude: 80° 7' 12.342" W

### BEL AIRE CONDOMINIUM

6515 COLLINS AVE

MIAMI BEACH, FL 33141

Scoring Date: 01/15/2009

Scored by: Alan Sakole

Requested by: Dade County Area 2

Well Survey  
Requested: 10/17/2008

Comments: Distance between DEP and DOH coordinates is 105.1ft

Discharge Date	Discharge ID	Eligibility Date	Program	Eligibility	Previous Score	New Score
08/30/1994	12101	03/22/1995	ATRP	ELIGIBLE	10	6



## FDEP Scoring Review

Deliverable Date: January 16, 2009

FacilityID: 139501511

Latitude: 25° 50' 54.4272" N

Longitude: 80° 7' 12.342" W

### Fire/Explosion Hazard

1. Free product or volatilized petroleum products at or above 20% of the Lower Explosive Limit (LEL) in existing utility conduits or vaults, buildings or other inhabited confined spaces (60 points).	0
2. Ignitable free product on surface waters or impoundments (60 points).	0

### Threat to Uncontaminated Drinking Water Supplies

1. Uncontaminated municipal or community well fields of greater than 100,000 gallons per day permitted capacity with a well within 1/2 mile of the site (30 points).	0
a. If the well field's 1 foot draw down contour is known to encompass the site regardless of the well field's distance from the site (20 points).	0
b. If the well field is located down gradient of the site (15 points).	0
2. Uncontaminated private wells constructed prior to date of contamination discovery, or uncontaminated public water system well field with less than 100,000 gallons per day permitted capacity with a well within 1/4 mile of the site (20 points).	0
a. If the well field's 1 foot drawn down contour is known to encompass the site regardless of the well field's distance from the site (10 points).	0
b. If the well field is located down gradient of the site (5 points).	0
3. Uncontaminated surface water body used as a public water system supply within 1/2 mile of the site (10 points).	0

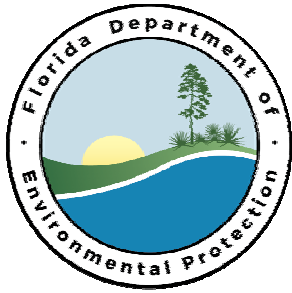
### Migration Potential

1. Source Characteristics (select only one) a. Recent spills or free product found in wells/boreholes (4 points) except free product of 2 inches or more in 2 or more wells/boreholes (6 points). b. Recent product loss or wells/groundwater contaminated but no free product (2 points).	2
2. Product Type (select only one) a. Light petroleum product (kerosene, gasoline, aviation fuel and similar petroleum products) with water soluble additives or enhancers (MTBE, ethanol and similar substances) (3 points). b. Light petroleum product with no additives or enhancers (2 points). c. Heavy petroleum product (fuel oil, diesel and similar petroleum products) (1 point).	1

### Environmental Setting

1. Site located in G-1 aquifer (4 points) or G-2 aquifer (2 points).	2
2. Site located in a high recharge permeability geological area (4 points).	0
3. Site located within 1/2 mile of an Outstanding Florida Water (1 point).	1

Total: 6



## Florida Department of Environmental Protection

Bob Martinez Center  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Rick Scott  
Governor

Carlos Lopez-Cantera  
Lt. Governor

Noah Valenstein  
Secretary

10/5/2017

**CERTIFIED MAIL #9414810200883587377025**  
**RETURN RECEIPT REQUESTED**

BEL-AIRE ON THE OCEAN CONDOMINIUM ASSOCIATION INC  
6515 COLLINS AVE  
MIAMI BEACH, FL 33141

Subject: Notice of Funding Availability for Assessment

BEL AIRE CONDOMINIUM  
6515 COLLINS AVE  
MIAMI BEACH, MIAMI-DADE COUNTY  
FDEP Facility ID#13 9501511  
Eligible Discharge Date: 8/30/1994 (ATRP)  
Priority Score: 6

Dear Property Owner:

Your property has been identified as a site affected by petroleum contamination that is eligible for an assessment funded by the State of Florida. On 1/8/2016 and 2/22/2016, the Florida Department of Environmental Protection (Department) sent you a letter with a Site Access Agreement attached. To date, a response to these letters has not been received by the Department.

Providing site access to your property to allow cleanup of the contamination is a required condition to maintain eligibility in the State-funded Petroleum Restoration Program. Should you fail to execute and return the Agreement to the Department within **14** calendars of the date of this letter, the Department may begin the process of revoking your eligibility in the program. If such eligibility is revoked, the total cost to cleanup your property will become your responsibility. For additional information regarding the Petroleum Restoration Program, please find a list of Frequently Asked Questions attached to this letter. Additional information is also posted on our website at <http://www.dep.state.fl.us/waste/categories/pcp/default.htm> under "Petroleum Restoration Program Property Owner/Responsible Party Information Meeting."

BEL-AIRE ON THE OCEAN CONDOMINIUM ASSOCIATION INC

FDEP Facility ID# 9501511

Page 2 of 2

10/5/2017

If you have any questions, please contact Grace Rivera, 850-245-8882,

Grace.Rivera@dep.state.fl.us.

Sincerely,

A handwritten signature in black ink, appearing to read 'Alan Sakole', with a stylized flourish extending to the right.

Alan Sakole  
Environmental Supervisor  
York Risk Services Group, Inc.  
Administrative Services Contractor  
[Alan.Sakole@yorkrsg.com](mailto:Alan.Sakole@yorkrsg.com)

Enclosure: Site Access Agreement  
Instructions for Completion of Site Access Agreement  
Frequently Asked Questions  
cc: File

**Note, this cover letter is for your records and should not be returned**



March 7, 2018

Mr. Jonathan Labie  
Florida Department of Environmental Protection  
Petroleum Cleanup Section 6  
2600 Blair Stone Road, Mail Station 4590  
Tallahassee, Florida 32399-2400

**RE: Final Deliverable – Low-Scored Site Initiative (LSSI) Site Assessment Report  
Vista Villas Apts  
6727 Indian Creek Drive  
Miami Beach, Miami-Dade County, Florida  
FDEP Facility ID No. 13/9501525  
Work Order #2017-96-W0259B  
Site Score: 11  
HCR Project #129355.01.31**

Dear Mr. Labie:

Handex Consulting & Remediation-Southeast, LLC (HCR) has completed Events #1 and #2, as outlined in Work Order #2017-95-W0259B and in Change Orders #1 and #3 at the above referenced facility. A site plan is provided as **Figure 1**. The purpose of the site assessment activities completed was to evaluate the soil and groundwater at the site, and determine if the site is eligible for a Site Rehabilitation Completion Order (SRCO), LSSI No Further Action (NFA) Order, or if additional assessment/remedial efforts are warranted.

### **SITE HISTORY**

The Vista Villas Apartments property is an apartment complex located at 6727 Indian Creek Drive, Miami Beach, Miami-Dade County, Florida. The site previously housed a 250-gallon underground storage tank (UST) containing heating oil with an unknown install date and a removal date of October 7, 1994.

The following items were denoted on the Inspection Report Form dated October 7, 1994, during the UST removal activities:

- Excavation dimensions were 4' x 7', and the integrity of the tank was noted as having rusted holes and was pitted all over.
- The highest organic vapor analyzer (OVA) reading was 440 parts per million (ppm).
- Groundwater was reached during the tank removal; free floating product was present on the groundwater, but not in the tank. The free floating product was removed using absorbent pads. Groundwater samples were collected to be analyzed using EPA Method 610 (Oil & Grease and polycyclic aromatic hydrocarbons [PAHs]). The laboratory could not run the sample, due to the free-phase hydrocarbons on the sample.

On June 11, 1996, the site was determined eligible for state funded rehabilitation assistance under the Abandoned Tank Restoration Program (ATRP). At this time, the site is currently scored 11 in the FDEP priority ranking system, and has one (1), discharge dated October 7, 1994.

The Florida Department of Health Bureau of Environmental Health (DOH) Potable Well Survey indicated that there were no large public supply wells within ½ mile of the site or any small potable wells within ¼ mile of the site. The Potable Well/Area Survey can be found in **Attachment A**.

On August 27, 2015, the Florida Department of Environmental Protection (FDEP) indicated that funds were available under Low-Score Assessment (LSA); however, the site was signed up under the Low-Scored Site Initiative (LSSI) on October 17, 2016. On March 16, 2017, the FDEP issued LSSI Work Order (WO) #2017-96-W0259B to HCR to conduct soil and groundwater assessment activities.

Prior to completion of Event #1, HCR tried several times to get off-site access from the neighboring apartment complex. Based on their lack of any response, FDEP agreed to move the proposed monitoring well locations. In addition, there is an older existing monitoring well located on this property that we were unable to sample, due to lack of access. Below details the activities authorized under Events #1 and #2 of WO #2017-96-W0286B.

### **FIELD ACTIVITIES**

As part of Event #1, HCR personnel mobilized on September 25 and 26, 2017, to the site to oversee Environmental Drilling Services, Inc. (EDS) in the installation of four (4) soil borings to 6 feet below land surface (ft bls) and three (3) monitoring wells to 12 ft bls with the exception of MW-1, which was installed to 5.5 ft bls. On September 29, 2017, HCR personnel mobilized to the site to conduct groundwater sampling of the newly installed wells.

As part of Event #2, and with prior authorization from FDEP, HCR personnel mobilized on January 3, 2018, to conduct confirmatory groundwater sampling of MW-1 through MW-3.

### ***Soil Boring Installation – September 25 and 26, 2017***

HCR personnel mobilized to the site on September 25 and 26, 2017, to oversee EDS in the installation of a four (4) soil borings (SB-1 through SB-4) and three (3) monitoring wells (MW-1 through MW-3). All soil borings were installed to 6 ft bls, while the soil boring at MW-1 was installed to 7 ft bls and the soil borings installed at MW-2 and MW-3 were installed to 10 ft bls. **Figure 2** depicts the soil boring and monitoring well locations with soil screening readings. The borings were advanced and sampled at every one foot until termination, and field screened with a flame ionization detector (FID) OVA.

FID field screening results reported vapor results ranging from 0.0 to 2882 ppm. Elevated OVA readings (>50 ppm for diesel) were noted in saturated zone. Generally, no response was noted in vadose zone (defined as 0 to 3 ft bls). FID field screening results are as shown in **Table 1** and on **Figure 2**. Field notes, calibration and boring logs as well as soil laboratory analytical results are provided in **Attachment B**.



Based on data collected, the site lithology generally consists of a fine sand from land surface to approximately 10 ft bls. Specific soil boring site lithology can be found on **Table 1**. Soil boring logs can be found in **Attachment B**.

#### ***Soil Analytical Results– September 26, 2017***

Based on the OVA screening data, three (3) soil samples labeled SB-2 @ 1-2', SB-3 @ 1-2', and SB-3 @ 1-2' were collected as authorized for laboratory analyses. The laboratory samples were analyzed using EPA Methods 8260 (Benzene, Toluene, Ethylbenzene, Total Xylenes [BTEX] & Methyl tert-butyl ether [MTBE]) & 8270 (PAHs) and Florida-Petroleum Range Organics (FL-PRO) (Total Recoverable Petroleum Hydrocarbons [TRPHs]).

Lab analyses did not indicate any concentrations that exceeded soil Cleanup Target Levels (CTLs). **Figure 3** depicts the soil analytical summary map. Soil analytical results are provided in **Attachment B** and are summarized in **Table 2**.

#### ***Monitoring Well Installation – September 26, 2017***

Three (3) monitoring wells MW-1 through MW-3 were installed on September 26, 2017. MW-1 was hand installed, due to its location between the two apartment complexes and a drill rig could not access this area. The borehole continued to collapse; therefore, MW-1 was only installed to approximately 5.5 ft bls. MW-1 is a 2-inch diameter well hand installed with 5 ft of 0.010-inch slotted Schedule 40 polyvinyl chloride (Sch 40 PVC) screen, and threaded to approximately 0.5 ft with Sch 40 PVC riser, whereas, MW-2 and MW-3 are 2-inch diameter monitoring wells completed with 12 ft of 0.010-inch slotted Sch 40 PVC screen, and threaded to approximately 2 ft with Sch 40 PVC riser. The screens was sand packed with 20/30 grade silica sand, followed by a fine sand seal, followed by grout to land surface. Surface completion included 2-ft x 2-ft x 4-inch concrete pads installed around 8-inch weight-bearing manhole covers. The wells were developed following installation. The well locations are depicted on **Figure 1**.

One (1) drum of soil cuttings was generated. Well Construction & Development Logs, drum manifest, and photos are provided in **Attachment C**.

#### ***Monitoring Well Sampling – September 29, 2017***

HCR personnel mobilized to the site on September 29, 2017, to conduct groundwater sampling of MW-1, MW-2, and MW-3. Representative groundwater samples were collected using a peristaltic sampling pump, and kept in a cooler with wet ice until delivered to the laboratory for analysis. The samples were collected per FS 2200 groundwater sampling Standard Operating Procedure (SOP), and sent under chain-of-custody to a certified laboratory for analyses. The groundwater samples from were analyzed using EPA Methods 8260 (BTEX & MTBE) & 8270 (PAHs), and FL-PRO (TRPHs).

Based on the September 29, 2017, gauging, groundwater flow direction was easterly towards the Atlantic Ocean. HCR does not know whether this site is tidally influenced. Field notes, calibration & groundwater sampling logs and complete groundwater analytical results are included in **Attachment D**. **Figures 4** and **5** depict the groundwater elevation contour and groundwater analytical summary maps, respectively. **Tables 3** and **4** summarize groundwater elevations and groundwater laboratory results, respectively. **Table 5** presents the Well Construction Details.

### ***Groundwater Analytical Results – September 29, 2017***

Laboratory analyses did not indicate any concentrations that exceeded groundwater CTLs. Complete analytical results are provided in **Attachment D** and are summarized in **Table 4**.

### ***Monitoring Well Sampling – January 3, 2018***

On January 3, 2018, HCR personnel mobilized to the site to conduct confirmatory groundwater sampling of MW-1, MW-2, and MW-3. HCR was unable to collect a groundwater sampling from MW-1. The well purged dry and did not recharge. Representative groundwater samples were collected using a peristaltic sampling pump, and kept in a cooler with wet ice until delivered to the laboratory for analysis. The samples were collected per FS 2200 groundwater sampling SOP and sent under chain-of-custody to a certified laboratory for analyses. The groundwater samples from were analyzed using EPA Methods 8260 (BTEX & MTBE), 8270 (PAHs), and FL-PRO (TRPHs).

Based on the January 3, 2018, gauging, groundwater flow direction was easterly towards the Atlantic Ocean. Field notes, calibration & groundwater sampling logs and complete groundwater analytical results are included in **Attachment D**. **Figure 4A** and **5** depict the groundwater elevation contour and groundwater analytical summary maps, respectively. **Tables 3** and **4** summarize groundwater elevations and groundwater laboratory results, respectively.

### ***Groundwater Analytical Results – January 3, 2018***

Laboratory analyses from MW-2 and MW-3 did not indicate any concentrations exceeded groundwater CTLs. Complete analytical results are provided in **Attachment D** and are summarized in **Table 4**.

## **CONCLUSIONS & RECOMMENDATIONS**

Based on soil and groundwater sampling results from Events #1 & #2, the following conclusions and recommendations can be made regarding this site at this time:

- Soil and groundwater samples collected and analyzed did not denote any contaminant concentrations exceeding soil or groundwater CTLs, respectively.
- At this time, and as discussed with FDEP, one (1) additional groundwater sampling event from MW-1 is needed to move the site to a No Further Action and subsequent Site Rehabilitation Completion Order. FDEP will issue a new Work Order for one (1) additional sampling of MW-1 and well abandonment activities. The well will be sampled during the “wet” season (June to November).
- The Site Characteristic Screening Form is included as **Table 6**.

If you have any questions or comments, please contact me at (850) 885-0813 x1405.

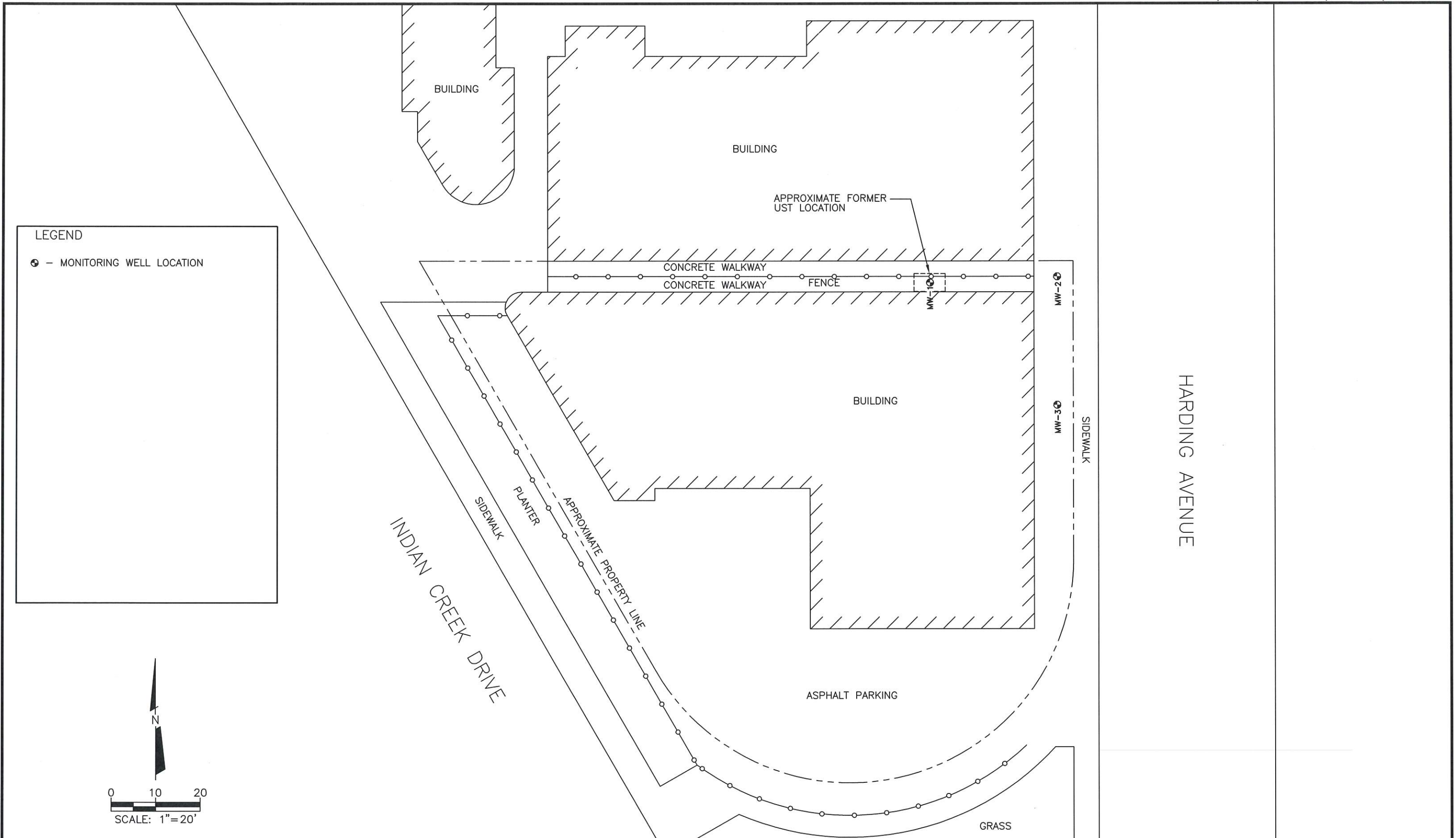
Sincerely,

*Malinda K. Bennett*

Malinda K. Bennett, E.I.  
Project Manager  
[mbennett@handexmail.com](mailto:mbennett@handexmail.com)







LEGEND

●

- MONITORING WELL LOCATION

MW-1	- MONITORING WELL LOCATION
9-29-17	- DATE SAMPLED
1	- BENZENE IN ug/L
40	- TOLUENE IN ug/L
30	- ETHYLBENZENE IN ug/L
20	- TOTAL XYLENES IN ug/L
20	- MTBE IN ug/L
14	- NAPHTHALENE IN ug/L
28	- 1-METHYLNAPHTHALENE IN ug/L
28	- 2-METHYLNAPHTHALENE IN ug/L
5000	- TRPH IN ug/L

U-

INDICATES THAT THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED

I-

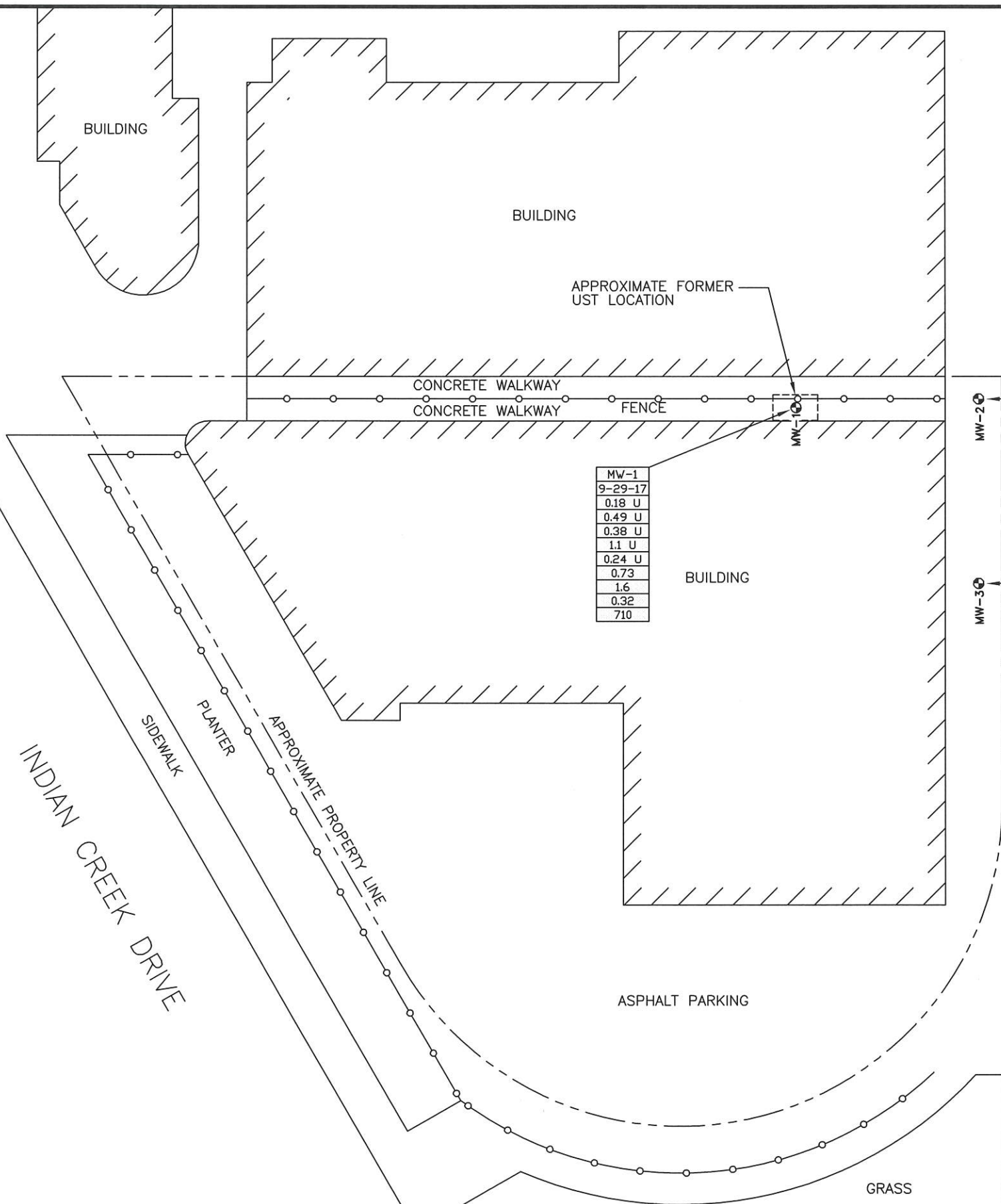
THE REPORTED VALUE IS BETWEEN THE LABORATORY METHOD DETECTION LIMIT AND THE LABORATORY PRACTICAL QUANTITATION LIMIT

BOLD-

EXCEEDS GROUNDWATER CLEANUP TARGET LEVELS (GCTLs)

-

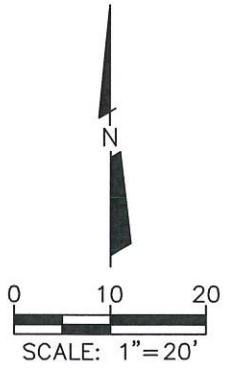
EXCEEDS GROUNDWATER CLEANUP TARGET LEVELS (GCTLs)



MW-2	MW-2
9-29-17	1-3-18
0.18 U	0.18 U
0.49 U	0.49 U
0.38 U	0.38 U
1.1 U	1.1 U
0.24 U	0.24 U
0.19 U	0.19 U
0.20 U	0.20 U
0.20 U	0.20 U
700	600 U

MW-1
9-29-17
0.18 U
0.49 U
0.38 U
1.1 U
0.24 U
0.73
1.6
0.32
710

MW-3	MW-3
9-29-17	1-3-18
0.18 U	0.18 U
0.49 U	0.49 U
0.38 U	0.38 U
1.1 U	1.1 U
0.24 U	0.24 U
0.19 U	1.9
0.20 U	0.35
0.20 U	0.67
600 U	740



3031 Eliza Road, Suite 2  
Tallahassee, Florida 32308  
Telephone: (850) 878-0813  
Fax: (850) 878-8492  
Certificate of Authorization# 26812

VISTA VILLAS APARTMENTS  
FDEP FAC ID #13/9501525  
6727 INDIAN CREEK DRIVE  
MIAMI BEACH, FLORIDA

FIGURE 5  
GROUNDWATER ANALYTICAL MAP



**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**  
**Rapid Risk Screening Form**

**Drycleaning Solvent Cleanup Program**

2600 Blair Stone Road, MS 4520

Tallahassee, FL 32399-2400

**Drycleaning Solvent Cleanup Program Facility Information**

---

Facility Name: **SUDSIES DRY CLEANERS & LAUNDROMATS**

Facility ID Number: **139600994**

Facility Address: **6792 COLLINS AVENUE, MIAMI BEACH, 33141**

Site Score: **30**

**Property Information**

---

Property Owner Name: **1135 97th St LLP**

Property Owner Address: **1140 Kane Concourse, 5th Fl, Bay Harbor Island, FL 33154**

Building base square feet: N/A

Property Use: ☐ Industrial ☒ Commercial / Retail ☐ Residential ☐ Other

If Other Note:

---

**Well Survey Information**

---

Number of large (>100,000 gpd) public supply wells within ½ mile: 0

Number of small potable wells within ¼ mile: 0

Sample Date for DOH well data: 9/22/2009

Are potable wells located within 500 feet of the facility: ☐ Yes ☒ No

**If No skip to Facility Operation Information**

Number of potable wells within 500 feet of facility: N/A

Are wells contaminated with drycleaning contaminants above GCTL: ☐ Yes ☒ No

If yes list the well IDs, contaminants, and concentrations:

N/A

---

Note any other contaminants detected, well IDs and concentrations:

---



## Facility Operation Information

Current Name of Facility:

Sudsies

Facility Type:

Active drycleaner or wholesale supply facility

☒

Dry-drop off or laundry

☐

Other Business

☐

If vacant, razed, undergoing development (other) note:

Is there an onsite potable water supply well: ☐ Yes ☒ Unknown

Is there an onsite Irrigation well observed: ☐ Yes ☒ Unknown

**For Active drycleaner or wholesale supply facility complete the following:**

Facility Owner Name:

Sudsies Inc. DBA Sudsies <sup>President</sup> Jason Loeb

Operator Name:

President Sudsies Jason Loeb (305) 803 7837

If facility is under new ownership note date operations commenced:

1995

Solvents used:

☒ PCE

☐ Petroleum Solvent

☐ GreenEarth

☐ Other

If other note solvent type:

Waste Management Concerns (note any obvious issues):

## Area Profile

Facility is located in:

Shopping center/strip mail

☒

Stand alone building

☐

Co-located with other business

☐

If Other Note:

Surrounding Land Uses

Within 500 feet of facility (check all that apply):

☐ Industrial

☒

Commercial / Retail

☒

Residential

☐ Other

If Other Note:

## Receptor Information

Receptor Information (check all that apply):	Within former drycleaner facility or building footprint	Co-located (sharing an adjacent wall or ceiling)	Within 150 feet of facility or strip mall
<b>Table 1</b>			
Daycare	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Long-term Care Facility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Table 2</b>			
Residence	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Identify the business name and locations (distances and direction from the facility) of any Table 1 receptors identified.

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Identify the locations (distances and direction from the facility) of any Table 2 receptors identified.

Residences ~ 25' West  
and 150' East

Identify nearby (within 150 feet of facility) buildings and businesses, excluding the subject property, that may use solvents.

---



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Form completed by:

Michael Black  
Print Name

Arco 63  
Company

Michael Black  
Signature

12/29/11  
Date

### Attachments:

- Site Photo 103-0903
- DOH Well Survey Map
- Parcel Map showing current structures and property boundaries

**My Home**  
Miami-Dade County, Florida

[miamidade.gov](http://miamidade.gov)


## Property Information Map



Aerial Photography - 2009

0 131 ft

This map was created on 12/8/2011 2:00:13 PM for reference purposes only.

Web Site © 2002 Miami-Dade County. All rights reserved.



Close

**Summary Details:**

Folio No.:	02-3211-063-0010
Property:	6772 COLLINS AVE
Mailing Address:	1135 97TH ST LLP
	1140 KANE CONCOURSE
	5TH FLR BAY HARBOR
	ISLAND FL
	33154-2018

**Property Information:**

Primary Zone:	6400 COMMERCIAL, MEDIUM INTENSITY
CLUC:	0018 CONDOMINIUM - COMMERCIAL
Beds/Baths:	0/0
Floors:	0
Living Units:	0
Adj Sq Footage:	9,130
Lot Size:	0
Year Built:	1988
Legal Description:	COLLINS PLAZA SHOPPING CENT CONDO UNIT A UNDIV 59.51 % INT IN COMMON ELEMENTS OFF REC 16433-4676 OR 19117-4584 01 2000 4

**Assessment Information:**

Year:	2011	2010
Land Value:	\$0	\$0
Building Value:	\$0	\$0
Market Value:	\$1,863,150	\$1,506,450
Assessed Value:	\$1,734,159	\$1,506,450

**Taxable Value Information:**

Year:	2011	2010
Taxing Authority:	Applied Exemption/ Taxable Value:	Applied Exemption/ Taxable Value:
Regional:	\$0/ \$1,734,159	\$0/ \$1,506,450
County:	\$0/ \$1,734,159	\$0/ \$1,506,450
City:	\$0/ \$1,734,159	\$0/ \$1,506,450
School Board:	\$0/ \$1,863,150	\$0/ \$1,506,450

**Sale Information:**

Sale Date:	12/2005
Sale Amount:	\$6,141,000
Sale O/R:	24075-4648
Sales Qualification Description:	Deeds which include more than one parcel
<a href="#">View Additional Sales</a>	

UM



## Potable Well Survey

Florida Department of Health Bureau of Water Programs

Facility ID: 9600994

County:

GPS Date / Method:

9/18/2009 DGPS OFFS

Request: 1599

DADE

Decimal Degrees: 25.852374

-80.12084

Name: FMR LAUNDROMATS

Deg Min Sec: 25 51 8.5484

80 7 15.0240

Address: 6792 COLLINS AVE

MIAMI BEACH, FL 33141

Large (>150,000 gpd) Public Supply Wells within 1/2 mile: 0

Small potable wells within 1/4 mile: 0

Sent to CHD: 9/9/2009

Comment:

Received: 9/21/2009



August 22, 2014

Mr. Wilbur Mayorga, P.E.  
Miami-Dade County  
Department of Regulatory and Economic Resources  
Environmental Resources Management  
701 NW 1<sup>st</sup> Court 4<sup>th</sup> Floor  
Miami, FL 33136-3912



**RE: Site Rehabilitation Completion Report with No Further Action with  
Conditions Proposal – Petroleum  
Canyon Ranch Hotel & Spa  
6801 Collins Avenue  
Miami Beach, Florida 33141  
FDEP Facility ID No. 13/9810231  
HCR Project: 127803.07.29**

Dear Mr. Mayorga:

Handex Consulting & Remediation-Southeast, LLC (HCR) is pleased to provide the Miami-Dade County Department of Regulatory and Economic Resources with this proposal report to request No Further Action with Conditions (NFAC) for the above-referenced site. A site plan is included as **Figure 1**.

### **SITE BACKGROUND**

On April 30, 2008, strong hydrocarbon odors and free product were identified by La Marca Construction Company, Inc. (La Marca) personnel during the installation of a generator and associated underground storage tank (UST) assembly. A Discharge Reporting Form (DRF) was subsequently submitted on May 1, 2008.

According to a Florida Department of Environmental Protection (FDEP) report, a 2,000-gallon capacity, fiberglass UST for use with a diesel-powered generator was installed in May 2008. Upon installation, the UST was filled with water in preparation of connection to the emergency generator at a future date.

Initial Remedial Activities (IRA) were initiated on May 1, 2008 and a total of 4,275 gallons of free product and petroleum-contact water (PCW) were removed. Additionally, approximately 68.25 tons of petroleum impacted soil was removed. Soil samples were screened with an Organic Vapor Analyzer (OVA) to delineate the excavation. The excavation was advanced until OVA readings were  $\leq 10$  parts per million (ppm) to the



east, north and west; however, the extent of petroleum-impacted soils could not be delineated to the south due to physical constraints.

Laboratory analytical results of the soil samples collected for waste characterization purposes, reported an ethylbenzene, total xylenes, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene concentration above the FDEP Chapter 62-777 Table II Soil Cleanup Target Levels (SCTLs) for Leachability Based on Groundwater Criteria. Additionally, Arsenic and Polychlorinated biphenyl (PCB) concentrations were detected above the Table II SCTLs based on Direct Exposure Commercial/Industrial use scenarios.

In a letter dated May 30, 2008, the Miami-Dade County Department of Environmental Resources Management (DERM) requested that a Source Removal Report be submitted and subsequent site assessment activities be conducted to evaluate the soil and groundwater at the site. On June 5, 2008, GLE Associates, Inc. on behalf of La Marca, submitted an Interim Source Removal Report (ISRR) to DERM recommending that site assessment activities be performed in the vicinity of the excavation area.

From September 2009 to March 2010, HCR conducted site assessment activities at the site. Based on laboratory analytical results, arsenic and PCB concentrations were delineated to the north and benzo(a)pyrene concentrations were delineated to the north and south in the soil onsite. Groundwater at the site was not fully delineated; however, laboratory analytical results indicated concentrations above the Table I Groundwater Cleanup Target Levels (GCTLs) but below the Table V Natural Attenuation Default Concentrations (NADCs). On June 23, 2010, HCR submitted a Site Assessment Report (SAR) and recommended preparation of a No Further Action Plan with Controls based on the limited exposure paths of the contaminants of concern at the site.

In deliverable review letters dated October 19, 2010 and January 4, 2011, DERM requested a SAR Addendum be submitted addressing their comments. On November 11, 2011, a SAR Addendum was submitted addressing DERM's comments and summarizing the results of additional soil and groundwater sampling. It was recommended that in preparation of a No Further Action (NFA) with Conditions determination, a NFA with Conditions Monitoring Only Plan (NFA-MOP) be implemented in order to demonstrate that the groundwater plume is stable or shrinking. In a deliverable review letter dated January 17, 2012, the Miami-Dade County Department of Permitting, Environment and Regulatory Affairs (now RER) approved the SAR Addendum and MOP.

On April 17, 2012, groundwater samples were collected from monitoring wells MW-2, MW-8, MW-10, CW-SE, and CW-SW as part of the first quarterly groundwater sampling event of the approved January 2012 MOP. Laboratory analyses of the groundwater samples collected on April 17, 2012 indicated a benzene concentration in monitoring well MW-2 and a 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene concentration in monitoring well CW-SE above the Table I GCTLs but below the Table V NADCs. The remaining groundwater samples analyzed indicated dissolved

hydrocarbon concentrations that were either below the Table I GCTLs or below detection levels (BDL). A Groundwater Monitoring Report was submitted in May 2012 and subsequently approved in a deliverable review letter dated June 18, 2012.

On July 17, 2012, depth to water measurements and groundwater samples were collected from monitoring wells MW-2, MW-8, MW-10, CW-SE, and CW-SW. Laboratory analyses of the groundwater samples collected on July 17, 2012 dissolved hydrocarbon concentrations concentration in monitoring well CW-SE above the Table I GCTLs but below the Table V NADCs. The remaining groundwater samples analyzed indicated dissolved hydrocarbon concentrations that were either below the Table I GCTLs or BDL. A Groundwater Monitoring Report was submitted in August 2012 and subsequently approved in a deliverable review letter dated September 21, 2012.

On October 24, 2012, depth to water measurements and groundwater samples were collected from monitoring wells MW-2, MW-8, MW-10, CW-SE, and CW-SW. Laboratory analyses of the groundwater samples collected on October 24, 2012 indicated dissolved hydrocarbon concentrations in monitoring well CW-SE above the Table I GCTLs but below the Table V NADCs. The remaining groundwater samples analyzed indicated dissolved hydrocarbon concentrations that were either below the Table I GCTLs or BDL. A Groundwater Monitoring Report was submitted in November 2012 and subsequently approved in a deliverable review letter dated December 21, 2012. The RER review letter also stated to continue the MOP in support of NFAC Approval Order.

On January 11, 2013, depth to water measurements and groundwater samples were collected from monitoring wells MW-2, MW-8, MW-10, CW-SE, and CW-SW. Laboratory analyses of the groundwater samples collected indicated dissolved hydrocarbon concentrations that were either below the Table I GCTLs or BDL. A Quarterly Sampling Report (QSR) was submitted in February 2013 by HCR requesting a Site Rehabilitation Completion with NFA with Conditions Proposal.

In a review letter dated March 19, 2013, RER stated that based on further review of the soil benzo(a)pyrene exceedances distribution data, the onsite PAH soil contamination is not related to the petroleum discharge and can be addressed as part of the non-petroleum contamination closure. Therefore, RER concluded the site could potentially qualify for a No Further Action without conditions for the petroleum related issues, provided, the NFA criteria is met for two consecutive sampling events. Monitoring well CW-SE illustrated concentrations of polynuclear aromatic hydrocarbons (PAHs) within Table I GCTLs in the last sampling event completed in January 2013; therefore, RER requested the completion of one more sampling event at CW-SE for PAHs analyses in order to confirm NFA criteria for the petroleum related issues at the site.

On June 18, 2013 groundwater samples were collected from CW-SE. Laboratory analyses of the groundwater sample collected on June 18, 2013 from monitoring well CW-SE indicated benzo(a)anthracene (1.1 µg/L) concentrations that were above Table I GCTLs but below the Table V NADCs. All other analyzed constituents were either

below the Table I GCTLs or BDL. HCR submitted a quarterly groundwater sampling report on August 19, 2013 requesting a Site Rehabilitation Completion Order (SRCO) with No Further Action with Controls (NFAC) be prepared for the site. In a letter dated September 3, 2013, DERM requested a re-sampling of monitoring well CW-SE to be analyzed for PAHs.

HCR submitted a groundwater sampling report on December 17, 2013 documenting the additional requested groundwater sampling activities and recommending no further actions with conditions for the site. The report was approved in regulatory correspondence dated May 27, 2014 and a request to submit a SRC report with a NFAC proposal was included. This report summarizes all soil and groundwater sampling activities completed at the site to support the NAFC request. A copy of the May 2014 review letter and the amended electronic mail correspondence are included in **Attachment A**.

## **SUMMARY FOR ASSESSMENT ACTIVITIES**

### **SOIL SAMPLING AND ANALYSES**

On September 25, 2009 HCR performed a series of soil borings (SB-1, SB-2, SB-3 and SB-4). The soil borings were located adjacent to the area of the UST. The area was previously excavated during the removal and replacement of the UST. Soil boring SB-2 was aborted on this date due to the presence of a concrete footer located between the UST and the building. The soil borings were advanced to a depth of one foot below the observed water table using a decontaminated stainless steel hand auger. Soil borings SB-1(2'), SB-1(2.5'), SB-3(2'), SB-4(2') and SB-4(2.5) were collected and sent for laboratory analysis by EPA Method 8260 for BTEX and MTBE, EPA Method 8310 for polycyclic aromatic hydrocarbons (PAHs), Method FL-PRO for total recoverable petroleum hydrocarbons (TRPH), EPA Method 8082 for polychlorinated biphenyl (PCBs), arsenic, cadmium, chromium and lead. Results of this analysis indicated exceedances of the FDEP Chapter 62-777 F.A.C. soil cleanup target levels (SCTLs) in soil samples SB-1(2') and SB-1(2.5'). Based on this information additional soil assessment was warranted and the contaminants of concern were established as PAHs, PCBs and arsenic.

On October 22, 2009 HCR returned to the site to install additional soil borings to aid in delineation of the established contaminants of concern. Soil borings SB-5 and SB-6 were advanced on the eastern end of the current UST. Soil boring SB-2 was advanced to the south of the UST inside the building. The soil borings were advanced to a depth representing one foot beyond the observed water table using a decontaminated stainless steel hand auger. Soil samples SB-2(2'), SB-5(2') and SB-6(2') were collected and sent for laboratory analysis for PAHs, TRPH, PCBs and arsenic. Results of this analysis indicated exceedances of the FDEP Chapter 62-777 F.A.C. SCTLs in soil samples SB-2(2'), SB-5(2') and SB-6(2'). Results from this event indicated the need for further delineation of soils to the north, south and east of the UST.

On January 19, 2010 HCR returned to the site to perform additional soil borings for delineation. Soil borings SB-7, SB-8, SB-9, SB-10 and SB-11 were advanced in the asphalt loading dock area and inside the storage areas of the building located adjacent to the UST. Soil borings were advanced to a total depth of four feet below land surface (bls) using a decontaminated stainless steel hand auger. Soil samples SB-7(0'-2'), SB-7(2'-4'), SB-8(0'-2'), SB-8(2'-4'), SB-9(0'-2'), SB-10(0'-2'), SB-10(2'-4'), SB-11(0'-2') and SB-11(2'-4') were collected and sent for laboratory analysis for PAHs, PCBs and arsenic. Results of this analysis indicated exceedances of the FDEP Chapter 62-777 F.A.C. SCTLs in all soil samples taken. Based on this information additional soil assessment was warranted.

On March 18, 2010 HCR performed additional soil borings. Soil borings SB-12, SB-13, SB-14, SB-15, SB-16, SB-17, SB-18, SB-20, SB-21 and SB-22 were advanced to further delineate soil quality conditions. Soil boring SB-19 was not advanced due to a concrete structure located at one foot bls. Soil borings were advanced to a total depth of four (4) feet below land surface (bls) using a decontaminated stainless steel hand auger. Soil borings were sampled in two (2) foot intervals for analysis for PAHs, PCBs and arsenic. Soil samples SB-12(0-2), SB-12(2-4), SB-13(0-2), SB-13(2-4), SB-14(0-2), SB-14(2-4), SB-15(0-2), SB-15(2-4), SB-16(0-2), SB-16(2-4), SB-17(0-2), SB-17(2-4), SB-18(0-2), SB-18(2-4), SB-20(0-2), SB-20(2-4), SB-21(0-2), SB-21(2-4) SB-22(0-2) and SB-22(2-4) were collected for confirmatory laboratory analyses for PAHs, PCBs and arsenic. The results indicated the presence of arsenic, PCBs and PAHs in the form of Benzo(a)pyrene in soils; therefore, further assessment was requested by DERM.

On February 2, 2011, HCR personnel installed two soil borings (SB-23 and SB-24) north of SB-12 and SB-13. Laboratory soil samples were collected from the 0-2 feet interval for analysis of PCBs. Results from the soil analytical reports indicated PCB concentrations in SB-24 exceed SCTLs and PCB concentrations reported for SB-23 were within SCTLs. Therefore, on March 30, 2011, HCR personnel installed an additional soil boring (SB-36) north of SB-24 to delineate PCB soil concentrations. Laboratory analytical results from SB-36 indicated PCB concentrations were within SCTLs or below laboratory method detection limits.

On February 2, 2011, HCR personnel installed three soil borings (SB-26, SB-27 and SB-28) which are located to the northeast, southeast and east of SB-16. Soil samples for laboratory analysis of PCBs were collected from the 0-2 and 2-4 feet interval. Laboratory analytical results indicated PCB concentrations for SB-27 and SB-28 were within SCTLs, delineating PCB concentrations to the east and southeast. Additionally, laboratory analytical reports indicated PCB concentrations for SB-26 exceed SCTLs. On March 30, 2011, two additional soil borings (SB-34 and SB-35) were installed in the solid waste storage area, northeast and north of SB-26 to delineate PCB concentrations in the vicinity of SB-26. Laboratory analytical results for SB-34 and SB-35 indicated PCB concentrations that exceed SCTLs. On June 3, 2011, HCR personnel installed soil borings SB-37 through SB-40 to delineate PCB concentrations in the northeast portion of the site. Laboratory analytical results indicated PCB concentrations are within SCTLs. No further PCB soil investigation activities were warranted at that time.



On February 2, 2011, HCR personnel installed five soil borings (SB-29 through SB-33) to assist DERM in understanding the extent of PAH concentrations, as requested in Comment 1 of DERM's October 19, 2010 correspondence, and to delineate benzo(a)pyrene concentrations along the western portion of the site. Soil samples for laboratory analysis by EPA 8310 for PAHs were collected from SB-29 (2'), SB-29 (4'), SB-30 (2'), SB-30 (3'), SB-31 (2'), SB-31 (3'), SB-32 (2'), SB-32 (4'), SB-33 (2') and SB-33 (4'). Laboratory analytical reports for the soil samples indicated concentrations of benzo(a)pyrene were either within Chapter 62-770 FAC Soil Cleanup Target Levels (SCTLs) or below laboratory method detection limits. At that time it was determined PAH concentrations were delineated and remained in the vicinity of the underground storage tank (UST) area, storage room, hallway, and parking area. Since these areas are capped by concrete and/or asphalt, acting as an engineering control, there are no potential exposure risks and the owner plans to pursue a conditional site closure. No further PAH soil delineation was required at that time.

Soil laboratory analytical data is summarized on **Table 1** through **Table 5** and depicted in **Figure 2** through **Figure 4**.

### **GROUNDWATER SAMPLING AND ANALYSIS**

Groundwater samples have been collected for more than one year in accordance with the approved MOP order dated January 17, 2012. Monitoring wells CW-SE, CW-SW, MW-2, MW-8 and MW-10 have been sampled in a quarterly basis for the required analyses included in the January 2012 MOP order. Quarterly sampling events were completed in April 2012, July 2012, October 2012, January 2013, June 2013 and November 2013. Groundwater sampling results indicate that petroleum concentrations above Table I GCTLs but below the Table V NADCs remain at monitoring well CW-SE. All other concentrations in sampled wells are below Table I GCTLs or below laboratory detection limits for at least three consecutive quarters.

A summary of groundwater elevation measurements is included in **Table 6**. A summary of the groundwater analytical results are provided in **Tables 7** and **8** and depicted on **Figures 5** and **6**.

### **CONCLUSIONS AND RECOMMENDATIONS**

Based on the soil assessment activities summarized above, the petroleum impacted soils appear to be delineated and is confined onsite in areas covered by either asphalt or concrete.

Based on the recent groundwater analytical results, overall petroleum constituent concentrations have attenuated to levels below Table I GCTL for at least three consecutive quarters with the exception of CW-SE which illustrates PAHs concentrations above Table I GCTLs but below Table V NADCs.

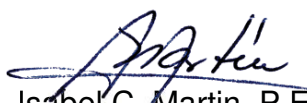
Based on the soil and groundwater data collected and described above, pursuant to Chapter 62-780.680(2), the site qualifies for NFA with Controls when the following is met:

1. Free product is not present and no fire or explosive hazard exists as a result of a release of non-aqueous phase liquids.
2. Contaminated soil is delineated in the unsaturated zone and remained in the vicinity of the UST area, storage room, hallway, and parking area. These areas are capped by concrete and/or asphalt, acting as an engineering control; therefore, there is no potential exposure.
3. Demonstrations that contaminant concentrations in groundwater at the property boundaries will not exceed Level I GCTLs.
4. Contamination is limited to the source area (<1/4 acre) and is not migrating from the localized source (minimum of 1 year of groundwater monitoring).
5. No Impact or potential impact to onsite freshwater surface water or marine surface water.

Based on the above described criteria for a Level II RBCA, HCR proposes to prepare and implement an engineering control plan and restrict groundwater use for the entire property and issue a site status of NFA with Controls.

If you should have any questions or require additional information, please contact Isabel Martin at (954) 681-4077, ext. 1357.

Respectfully Submitted,  
**Handex Consulting and Remediation Services-Southeast, LLC**

  
Isabel C. Martin, P.E.  
Senior Project Manager

## **TABLES**

TABLE 1	SUMMARY OF TOTAL ORGANIC VAPOR ANALYSES OF SOIL
TABLE 2	SUMMARY OF SOIL ANALYSES, PCBs
TABLE 3	SUMMARY OF SOIL ANALYSES, BTEX & MTBE
TABLE 4	SUMMARY OF SOIL ANALYSES, PAHs AND TRPH
TABLE 5	SUMMARY OF SOIL ANALYSES, METALS
TABLE 6	GROUNDWATER ELEVATION TABLE
TABLE 7	SUMMARY OF GROUNDWATER ANALYSES: BTEX/MTBE
TABLE 8	SUMMARY OF GROUNDWATER ANALYSES: PAHs & TRPH

## **FIGURES**

FIGURE 1	SITE PLAN
FIGURE 2	DISTRIBUTION OF METALS IN SOIL
FIGURE 3	DISTRIBUTION OF PCBs IN SOIL
FIGURE 4	DISTRIBUTION OF PAHs IN SOIL
FIGURE 5	DISTRIBUTION OF BTEX AND MTBE IN GROUNDWATER
FIGURE 6	DISTRIBUTION OF PAHs AND TRPH IN GROUNDWATER

## **ATTACHMENTS**

ATTACHMENT A	REGULATORY CORRESPONDENCE
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**TABLE 7**  
**SUMMARY OF GROUNDWATER ANALYSES**  
**BTEX & MTBE by EPA Method 8260B**

**CANYON RANCH HOTEL**  
**6801 COLLINS AVENUE, MIAMI BEACH, FLORIDA**  
**FDEP Facility ID# 13/9810231**

Location	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
Table I GCTLs		1	40	30	20	20
Table V NADSCs		100	400	300	200	200
CW-SE	09/25/09	0.630 I	1.40	18.7	42.6	0.261 U
	01/19/10	NS	NS	NS	NS	NS
	04/17/12	0.59 I	0.24 U	0.32 I	0.70 I	0.21 U
	07/17/12	0.42 I	0.14 U	0.16 U	0.46 I	0.13 U
	10/24/12	0.41 I	0.30 I	1.1	2.2	0.13 U
	01/11/13	0.25 I	0.25 I	0.40 I	1.0 I	0.13 U
CW-SW	09/25/09	0.211 U	1.27	4.69	33.6	0.261 U
	01/19/10	NS	NS	NS	NS	NS
	04/17/12	0.28 U	0.24 U	0.25 U	0.68 U	0.21 U
	07/17/12	0.13 U	0.14 U	0.16 U	0.44 U	0.13 U
	10/24/12	0.18 I	0.27 I	0.95 I	2.7	0.13 U
	01/11/13	0.13 U	0.14 U	0.16 U	0.44 U	0.13 U
CW-NE	09/25/09	0.250 I	1.08	3.95	4.26	0.261 U
	01/19/10	NS	NS	NS	NS	NS
CW-NW	09/25/09	0.211 U	1.63	2.31	8.46	0.430 I
	01/19/10	NS	NS	NS	NS	NS
MW-1	11/04/09	0.211 U	0.247 U	0.196 U	0.298 U	0.261 U
	01/19/10	NS	NS	NS	NS	NS
	02/02/11	NS	NS	NS	NS	NS
MW-2	11/04/09	1.38	5.13	1.19	5.74	0.261 U
	01/19/10	NS	NS	NS	NS	NS
	04/17/12	1.3	4.7	2.5	9.2	0.51 I
	07/17/12	0.85 I	2.6	1.8	4.4	0.13 U
	10/24/12	0.32 I	0.67 I	0.81 I	1.2 I	0.13 U
	01/11/13	0.25 I	0.49 I	0.68 I	1.0 I	0.13 U
MW-3	03/30/10	NS	NS	NS	NS	NS
	02/02/11	NS	NS	NS	NS	NS
MW-4	03/30/10	NS	NS	NS	NS	NS
	02/02/11	NS	NS	NS	NS	NS
MW-5	03/30/10	NS	NS	NS	NS	NS
	02/02/11	0.249 U	0.201 U	0.210 U	0.26 U	0.460 U
MW-6D	4/4/2011	NS	NS	NS	NS	NS



**TABLE 7**  
**SUMMARY OF GROUNDWATER ANALYSES**  
**BTEX & MTBE by EPA Method 8260B**

**CANYON RANCH HOTEL**  
**6801 COLLINS AVENUE, MIAMI BEACH, FLORIDA**  
**FDEP Facility ID# 13/9810231**

Location	Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
<b>Table I GCTLs</b>		<b>1</b>	<b>40</b>	<b>30</b>	<b>20</b>	<b>20</b>
<b>Table V NADSCs</b>		<b>100</b>	<b>400</b>	<b>300</b>	<b>200</b>	<b>200</b>
MW-7	4/4/2011	NS	NS	NS	NS	NS
	6/8/2011	NS	NS	NS	NS	NS
MW-8	4/4/2011	NS	NS	NS	NS	NS
	4/17/2012	0.28 U	0.24 U	0.27 I	0.68 U	0.21 U
	7/17/2012	0.13 U	0.14 U	0.16 U	0.44 U	0.13 U
	10/24/2012	0.13 U	0.14 U	0.16 U	0.44 U	0.13 U
	1/11/2013	0.13 U	0.14 U	0.16 U	0.44 U	0.13 U
MW-9	4/4/2011	NS	NS	NS	NS	NS
MW-10	9/9/2011	NS	NS	NS	NS	NS
	4/17/2012	0.28 U	0.24 U	0.25 U	0.68 U	0.21 U
	7/17/2012	0.13 U	0.14 U	0.16 U	0.44 U	0.13 U
	10/24/2012	0.13 U	0.14 U	0.16 U	0.44 U	0.13 U
	1/11/2013	0.13 U	0.14 U	0.16 U	0.44 U	0.13 U

**NOTES:**

All results reported in micrograms per liter (ug/l). NS = Not Sampled.

"BTEX" denotes volatile organic aromatics (benzene, toluene, ethylbenzene, and total xylenes). "MTBE" denotes methyl-tert-butyl ether.

"Table I" refers to Table I, Groundwater Cleanup Target Levels (GCTLs) of FDEP Chapter 62-777 FAC.

Table V refers to Table V, Natural Attenuation Default (Source) Concentrations (NADSCs) of FDEP Chapter 62-777 FAC.

"I" = Result is between the Practical Quantitative Limit (PQL) and the Method Detection Limit (MDL).

"U" = The compound was analyzed for but not detected.

**BOLD** numbers indicate Table I GCTL exceedance

**BOLD** and underlined numbers indicate Table V NADSC exceedance



## NO FURTHER ACTION WITH CONDITIONS (NFAC) PROPOSAL

**Canyon Ranch Hotel  
6801 Collins Avenue  
Miami Beach, FL 33141  
FDEP Facility ID# 13/810231**

### Statement of Professional Certification

I, Isabel Martin, P.E. #62562, certify that I currently hold an active license in the state of Florida and am competent through education and experience to provide the engineering service contained in this report. I further certify that, in my professional judgment, this report meets the requirements of Section 62-780.680, and was prepared by me or under my responsible charge. Moreover, I certify that HCR holds an active Certificate of authorization #26812 to provide the engineering service.

Reviewed by: 

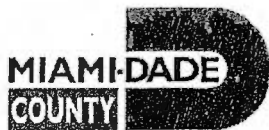
Isabel Martin, PE

Senior Project Engineer

Florida License # 62562

Date Signed: 8/22/14





Carlos A. Gimenez, Mayor

February 8, 2017

Department of Regulatory and Economic Resources  
Environmental Resources Management  
701 NW 1st Court, 4th Floor  
Miami, Florida 33136-3912  
T 305-372-6700 F 305-372-6982

miamidade.gov

CERTIFIED MAIL NO. 7013 2630 0001 2416 6578  
RETURN RECEIPT REQUESTED

Central Carillon Beach Condominium Assoc., Inc.  
c/o Lowy and Cook, P.A.  
Attn: Ronald S. Lowy, Esq  
169 E Flagler Street, Suite 700  
Miami, FL 33131

RE: Letter dated January 6, 2017 and submitted by Lowy and Cook, P.A. regarding the Carillon Hotel and Spa facility (UT-4447/File -11907/FDEP 139810231) located at, near, or in the vicinity of 6801 Collins Avenue, Miami, Miami Beach, Miami-Dade County, Florida.

Dear Mr. Lowy:

The Department of Regulatory and Economic Resources-Division of Environmental Resources Management (DERM) has received your letter, received January 9, 2017, in response to the Notice of Intent to Enter into Environmental Restrictive Covenant with Florida Department of Environmental Protection letter issued to you by Akerman, LLP on behalf of the Carillon Hotel and Spa facility.

DERM acknowledges that you are requesting additional time to review the No Further Action with Conditions proposal and draft restrictive covenant. As the Carillon Hotel and Spa facility is subject to specific timeframes to comply with directives of Chapter 62-780, Florida Administrative Code, please provide your response to the review of the referenced documents as they relate to Central Carillon Beach Condominium Association, Inc. within sixty (60) days of receipt of this letter. If additional time is needed, please submit your request in writing.

Please provide your comments, if any, to DERM and copy Mary Stewart, Office of General Counsel, Florida Department of Environmental Protection at [Mary.Stewart@dep.state.fl.us](mailto:Mary.Stewart@dep.state.fl.us)

If you have any questions regarding this letter please contact Thomas Kux, P.G., of the DERM at (305) 372-6700

Sincerely,

Wilbur Mayorga, P.E., Chief  
Environmental Monitoring & Restoration Division

WM/tk

attach

pc: FDEP File

ec: Jason S. Lichtstein, Akerman, LLP, [Jason.Lichtstein@akerman.com](mailto:Jason.Lichtstein@akerman.com)  
Mary Stewart, FDEP [Mary.Stewart@dep.state.fl.us](mailto:Mary.Stewart@dep.state.fl.us)

Every Day



# UNIVERSAL ENGINEERING SCIENCES

RECEIVED

04/24/2018

DERM ENVIRONMENTAL MONITORING &  
RESTORATION DIVISION

**MODIFIED SITE ASSESSMENT PROPOSAL  
TASK 1 DELIVERABLE (PO# B28D8C)**

**SARATOGA APARTMENTS**

6834 Harding Avenue  
Miami Beach, Miami-Dade County, Florida 33141  
FDEP Facility ID: 13-9402506  
139402056  
UES Project No. 2140.1800005.0000  
UES DOCS No. 1562106

Proposal Date: April 24, 2018

Prepared for:

Miami-Dade County Department of Regulatory and Economic Resources  
Division of Environmental Resources Management  
701 NW 1<sup>st</sup> Court, 4<sup>th</sup> Floor  
Miami, Florida 32399  
Attention: Ms. Caroline H. Herman, M.S., ERPS

Prepared by:

Universal Engineering Sciences, Inc. (GC884)  
9960 NW 116<sup>th</sup> Way, Suite 8  
Medley, Florida 33178  
305.249.8434  
[www.UniversalEngineering.com](http://www.UniversalEngineering.com)

Prepared by:

Paul Saneaux  
Environmental Project Manager

Reviewed by:

Leigh P. Marshallsay, M.A.  
Environmental Department Manager



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# UNIVERSAL ENGINEERING SCIENCES

Consultants In: Geotechnical Engineering • Environmental Sciences  
Geophysical Services • Construction Materials Testing • Threshold Inspection  
Building Inspection • Plan Review • Building Code Administration

## LOCATIONS:

- Atlanta, GA
- Daytona Beach
- Fort Myers
- Fort Pierce
- Gainesville
- Jacksonville
- Miami
- Ocala
- Orlando (Headquarters)
- Palm Coast
- Panama City
- Pensacola
- Rockledge
- Sarasota
- Tampa
- Tifton, GA
- West Palm Beach

April 24, 2018

Ms. Caroline H. Herman, M.S., ERPS

Miami-Dade County Department of Regulatory and Economic Resources

Division of Environmental Resources Management

701 NE 1<sup>st</sup> Court, 4<sup>th</sup> Floor

Miami, Florida 33136

Reference: Modified Site Assessment Proposal – Task 1 Deliverable (PO# B28D8C)  
Saratoga Apartments  
FDEP Facility I.D. 13-9402056  
6834 Harding Avenue  
Miami Beach, Miami-Dade County, Florida 33141  
UES Project No. 2140.1800005.0000  
UES DOCS No. 1562106

Dear Ms. Herman:

Universal Engineering Sciences, Inc. (UES) has prepared this submittal for Task I of the Scope of Work for the above-referenced facility (the “subject property”). The findings of UES’ file review, site reconnaissance/field measurement visit and area survey are presented in the sections below. The site specific health and safety plan is enclosed with the submittal. A Site Location Map is attached as Figure 1 and a Site Plan/Proposed Sampling Location Map is presented as Figure 2 in **Appendix A**.

## SITE ACCESS AGREEMENT

A FDEP site access agreement was signed and returned to the FDEP by Mr. Thomas B. Lanigan, the subject property owner, on October 28, 2017.

## SITE SPECIFIC HEALTH AND SAFETY PLAN

UES prepared a Health and Safety Plan for actions planned under this Purchase Order (PO #B28D8C). A copy of the plan is submitted as **Appendix B** under this document.

## FILE REVIEW

UES conducted a review of available regulatory records on the FDEP Oculus on-line document management system and the on-line document maintained by The Miami-Dade County Department of Environmental Resource Management (DERM). The FDEP Historical Summary Worksheet (Attachment 3) with UES’ Additional Historical Summary and associated supporting documentation is submitted as **Appendix C** under this document.

## SITE RECONNAISSANCE/FIELD MEASUREMENT VISIT

The subject property is located at 6834 Harding Avenue in Miami Beach, Miami-Dade County, Florida 33141. The site is located in the central, eastern portion of Section 11, Township 53 South, Range 42 East. The Harding Avenue right-of-way adjoins the subject property to the east. Commercial properties characterize the area to the east. The areas to the north, west, and south are characterized by single- and multi-family residences.

On March 20, 2018, UES visited the site to evaluate the current conditions. The subject property is developed with a two-story apartment building. The subject property is improved with landscaped areas and associated utilities. The former UST area, now covered with a raised brick planter, was observed at the northeast corner of the apartment building within a landscaped planter area. Two possible vent pipes were observed within the planter. No groundwater monitoring wells, remediation systems, or evidence of previous soil borings were observed at the subject property.

Depth to water and total well depth measurements were not conducted as existing groundwater monitoring wells were not observed at the subject property.

Field notes and photographs are provided in **Appendix D**.

## **SITE BACKGROUND**

Based on the historical review of the subject property, the on-site apartment building was constructed in 1955 and is currently in operation.

A Discharge Reporting Form (DRF) was completed on October 18, 1994 following the closure of a 275-gallon diesel fuel/heating oil UST on October 17, 1994. The UST was located at the northeast corner of the apartment building. According to the DRF, the method of initial discovery was impacted groundwater observed during removal of the UST. The amount of diesel fuel/heating oil discharged was unknown and the cause was unknown.

According to a DERM Storage Tank Section Inspection Request Form dated October 17, 1994, groundwater was encountered at approximately 4 feet below ground surface (bgs) during the removal of the 275-gallon diesel fuel/heating oil underground storage tank (UST) by Florida Environmental Engineering. The DERM Inspector noted that the UST appeared intact and the associated piping was removed. Approximately 150 gallons of diesel fuel/heating oil was removed from the UST and it was rendered inert. A note in DERM's Storage Tank Section: Inspection Request form stated that the consultant did not screen soils from the UST excavation with an Organic Vapor Analyzer as the UST's contents were heating oil. A Contamination Assessment Report was not completed by the consultant. Observations of the quality of the groundwater within the UST excavation were not noted; however, a groundwater sample for analysis of Polynuclear Aromatic Hydrocarbons (PAHs) was reportedly collected by the DERM Inspector. According to a comment on a Laboratory Analysis Record Enforcement Form dated October 17, 1994, a layer of free floating product was observed in the sample and it was determined to be an unsuitable matrix for analysis of PAHs. The sample was reportedly held pending analysis of Oil and Grease. Records of laboratory results for the sample were not available on DERM's or FDEP's regulatory databases.

The discharge was deemed eligible for the Abandoned Tank Restoration Program on December 30, 1994 and FDEP correspondence dated April 16, 1996 indicates the discharge received a score of 9. A DERM Field Inspection Summary Form dated December 13, 2017 states the current score is 6. According to the regulatory documents available from the FDEP and DERM, no additional soil and groundwater assessments or remedial activities have been completed at the subject property.

## **SUPPLEMENTAL SITE ASSESSMENT – PROPOSED SCOPE OF WORK**

UES has prepared this scope of work (SOW) to determine if contaminated soil and/or groundwater exists at the subject property and to attempt to define the horizontal and vertical extent of potential petroleum impacts in the soil and groundwater at the subject property. Assessment data will be evaluated to determine risk and liability to

human health and the environment and also to determine future funding needs for additional assessment and remedial actions. Assessment activities will be completed in accordance with Florida Administrative Code (F.A.C.) 62-780 and the FDEP Standard Operating Procedures (SOPs).

Notification of activities specified in this SOW will be made to all applicable persons, the site operator, site owner, responsible party, and the FDEP site manager to ensure that the field work is coordinated. The field work notification will be e-mailed at least seven calendar days prior to when the field work is to be performed and will indicate the exact day(s) of the proposed field work. Open communication with the FDEP site manager will be maintained during all phases of the field work to ensure that the intended SOW is completed to the satisfaction of the FDEP. The FDEP site manager will be apprised of the results of all fieldwork as they are available to determine if additional work is to be approved prior to it being performed.

#### **SOIL BORING ADVANCEMENT, SOIL GAS SURVEY, SOIL SAMPLE COLLECTION AND METHODOLOGY**

Although the Schedule of Pay Items (SPI) stipulates a total of five soil borings completed via hand auger, UES proposes advancing up to three soil borings at the subject property due to the limited assessment area and accessibility. Figure 2 in **Appendix A** shows the proposed soil boring and groundwater monitoring well locations. Soil screening and sampling procedures will be conducted according to the current FDEP SOPs. Soil screening and lithological descriptions will be completed at two 2-foot intervals from land surface to the groundwater table until soil boring termination. The soil samples will be field screened using an organic vapor analyzer (OVA) equipped with a photoionization detector (PID).

According to the SPI, the FDEP proposed the utilization of hollow stem auger, mud rotary or sonic drilling methods; however, due to the proposed soil boring/monitoring well locations being located within eastern landscaped planter area with limited access and northern sidewalk, UES proposes the use of direct-push technology (DPT) utilizing a track-mounted drilling rig for collection of soil samples at the subject property. A limerock fill material and the Miami Limestone Formation likely exists beneath the top soil of the landscaped area and the adjoining concrete sidewalk. As such, UES has deemed it impractical to attempt hand auger techniques at this site.

UES proposes to collect soil samples from the following locations:

- SB-1/MW-1: A soil sample will be collected within the sidewalk immediately north of the former UST area and the current raised brick planter area.
- SB-2/MW-2: A soil sample will be collected approximately 8 feet east of the former UST area and the current raised brick planter area.
- SB-3/MW-3: A soil sample will be collected approximately 10 feet south of SB-2/MW-2 pending access.

UES will collect a total of three (3) soil samples from the interval exhibiting highest OVA reading, staining and/or odor. If none are observed, soil will be collected from the interval directly above the water table (vadose zone) estimated to be the 4 to 6 foot interval.

Soil samples will be submitted for laboratory analysis of benzene, toluene, ethylbenzene and total xylenes/methyl-tert-butyl-ether (BTEX/MTBE) via Environmental Protection Agency (EPA) Method 8260, PAHs via EPA Method 8270 and total recoverable petroleum hydrocarbons (TRPHs) via the Florida Petroleum Range Organics (FL-PRO) Method. In addition, the soil sample collected from SB-1 will be analyzed for lead via EPA Method 6010. If soil samples show impacts in excess of soil cleanup target levels (SCTLs), Synthetic Precipitation Leaching Procedure (SPLP) extraction will be run and BTEX/MTBE and PAHs analysis will be run on the extracted leachate. These

extractions and any allowance to fractionate TRPH of necessary analysis will be discussed with FDEP prior to giving lab authorization.

Due to the proximity of the soil borings to the City of Miami Beach right-of-way (ROW), it is possible that the track-mounted drill rig may block the ROW for a period of time. Therefore, it may be prudent to assume that a City of Miami Beach ROW Permit may need to be obtained for this SOW.

#### **MONITORING WELL INSTALLATION AND GROUNDWATER COLLECTION AND METHODOLOGY**

The proposed monitoring wells will be installed via DPT drilling techniques. Monitoring well MW-1 will be completed to 12 feet bgs and will consist of two feet of 2-inch diameter Schedule 40 PVC solid riser connected to 10 feet of 2-inch diameter Schedule 40 PVC with 0.010-inch factory slotted well screen. MW-1 will be finished with a 2 foot by 2 foot concrete well pad and an 8-inch steel manhole cover. Monitoring wells MW-2 and MW-3 will be constructed similarly, with the exception of 3 feet of 2-inch diameter Schedule 40 PVC solid riser. Monitoring wells MW-2 and MW-3 will be finished with 1 foot of stick-up above existing grade and a water-tight locking cap. Each monitoring well will be properly developed. Figure 2 in **Appendix A** shows the proposed monitoring well locations. The groundwater samples will be submitted for laboratory analysis for the following parameters:

- MW-1: Gasoline/Kerosene Group which includes BTEX/MTBE and Volatile Organic Halocarbons (VOHs) by EPA Method 8260, PAHs by EPA Method 8270, TRPH by FL PRO Method, ethylene dibromide (EDB) by EPA Method 8011 and total lead by EPA Method 6010.
- MW-2 and MW-3: BTEX/MTBE, PAHs and TRPH.

#### **SITE RESTORATION**

Due to the nature of the equipment required to perform the soil borings and installation of monitoring wells, some property disturbance should be expected. The soil boring and groundwater monitoring well (SB-1/MW-1) will be finished with a concrete well pad and steel manhole cover. The soil borings and monitoring wells SB-2/MW-2 and SB-3/MW-3 will be completed within the landscaped planter area. UES will attempt to minimize damage to the top soils and plants. UES will notify the property owner if damage to the landscaping is unavoidable.

#### **ANALYTICAL LABORATORY STATEMENT**

Advanced Environmental Laboratories, Inc. (AEL) (E82535) of Miramar, Florida has been selected to facilitate the analytical testing. UES verifies that the laboratory listed above is fully certified by the Department of Health Environmental Laboratory Certification Program for all the applicable matrix/test method/analyte combinations for non-potable water which are listed above, and that they will be contracted by UES to perform, as listed above, unless an exception was granted by the FDEP Petroleum Restoration Program. If the laboratory loses certification for any analyte or group of analytes listed, or is unable to perform certification for any analyte or group of analytes listed, or is unable to perform the required analyses, UES will contract another laboratory to perform those analyses, and the FDEP/LP site manager will be notified of the change in writing pursuant to Preapproval Program procedures. UES acknowledges that if it mistakenly contracts a laboratory that is not fully certified for all the applicable matrix/test method/analyte combinations, UES will forfeit all the costs associated with sampling and analyses of any sample for which the analyzing laboratory was not fully certified, because lack of certification rendered those analytical results invalid.



Modified Site Assessment Proposal  
Saratoga Apartments – FDEP Facility ID: 13-9402056  
Miami Beach, Miami-Dade County, Florida 33141

UES Project No. 2140.1800005.0000  
UES DOCS No. 1562106  
April 24, 2018

TASK 2 REPORT/DELIVERABLES

UES will prepare and submit an Interim Assessment Report that includes copies of permits, field notes, sampling logs, boring logs, well construction logs, laboratory analytical reports, updated tables and figures and recommendations.


The work will be scheduled following UES' receipt of FDEP's review and acceptance. If you have any questions or need additional information, please contact us at your convenience.

Respectfully submitted,

**UNIVERSAL ENGINEERING SCIENCES, INC.**



Paul Saneaux  
Environmental Project Manager  
psaneaux@universalengineering.com



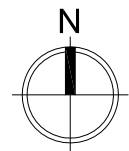
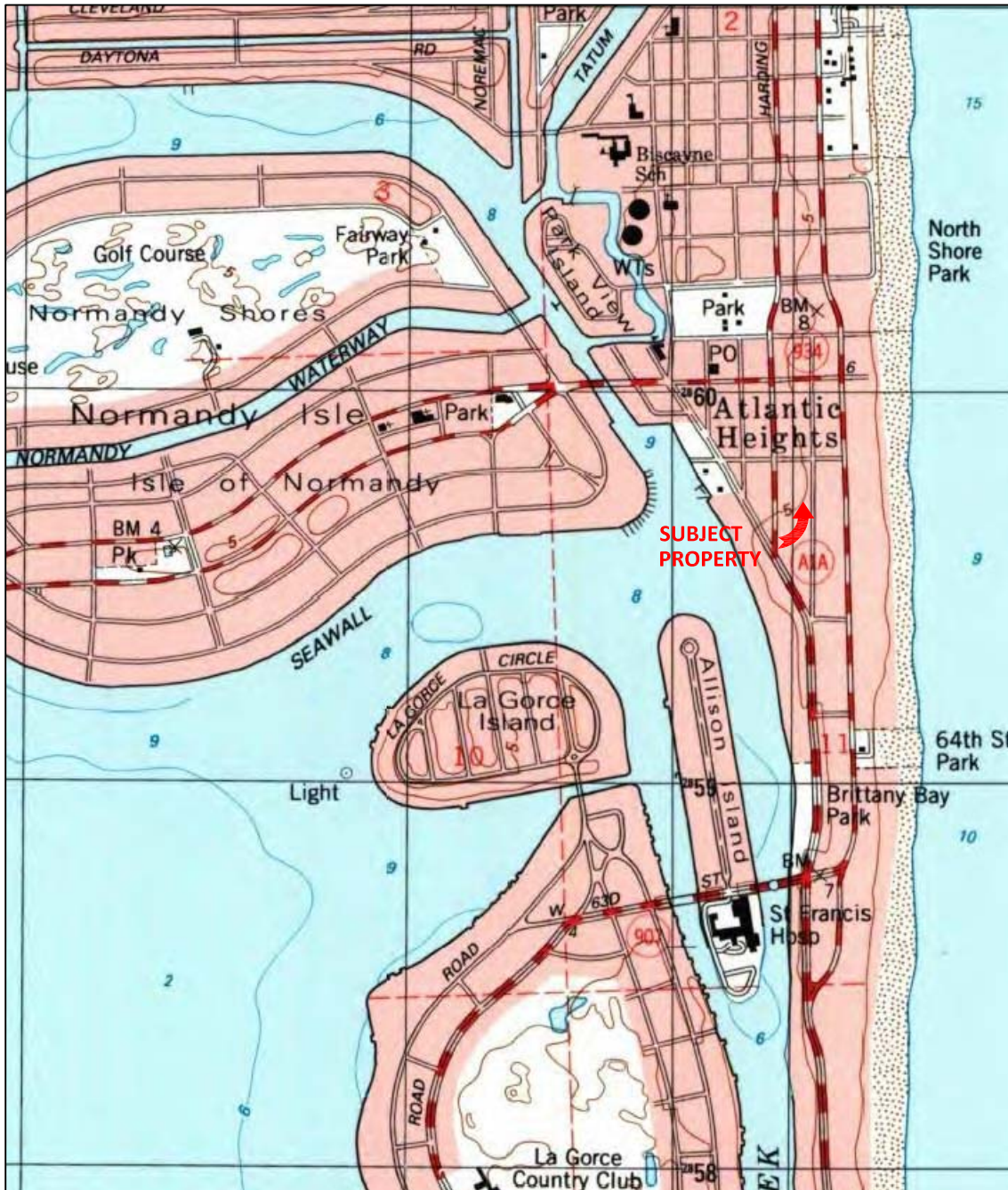
Leigh P. Marshallsay, M.A.  
Environmental Department Manager  
lmarshallsay@universalengineering.com

Cc: Mr. Thomas B. Lanigan (SFloridacondos@gmail.com)

# APPENDIX A



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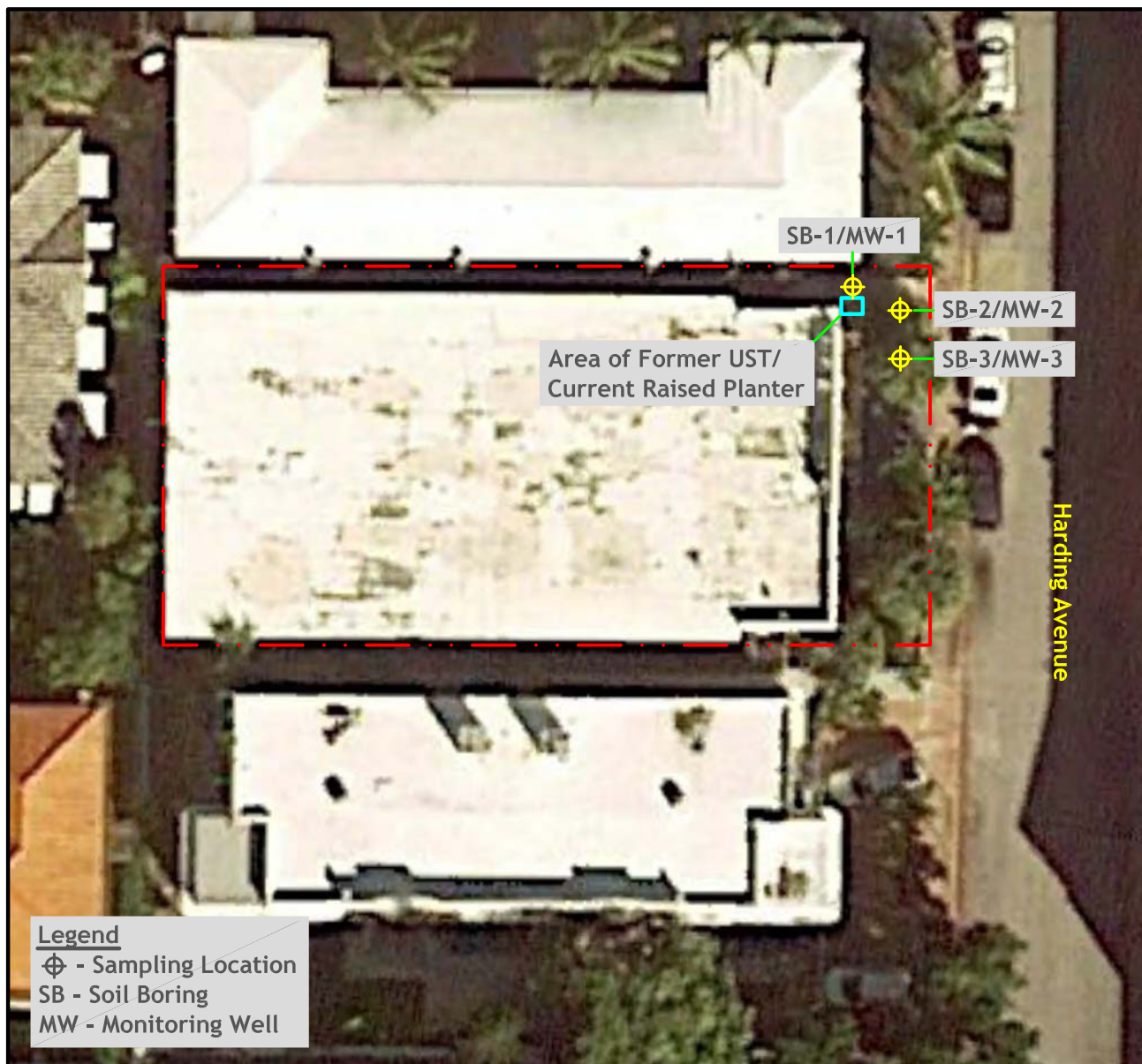
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ENGINEERING SCIENCES

Saratoga Apartments - FDEP # 13-9402056  
6834 Harding Avenue  
Miami Beach, Miami-Dade County, Florida 33141

#### USGS PROPERTY LOCATION MAP

DRAWN BY:	PS	DATE:	4/23/2018	CHECKED BY:	LM	DATE:	4/23/2018
SCALE:	NTS	PROJECT NO:	2140.1800005.0000	DOCs NO:	1562106	FIGURE NO:	1





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ENGINEERING SCIENCES

Saratoga Apartments - FDEP #13-9402056  
 6834 Harding Avenue  
 Miami Beach, Miami-Dade County, Florida 33141

SITE PLAN / PROPOSED SAMPLING LOCATION PLAN

DRAWN BY:	PS	DATE:	4/23/2018	CHECKED BY:	LM	DATE:	4/23/2018
SCALE:	1" = 25'	PROJECT NO:	2140.1800005.0000	DOCs NO:	1562106	FIGURE NO:	2

Florida Department of Environmental Protection-- Petroleum Restoration Program

TEMPLATE SITE ASSESSMENT REPORT

[Signature Page]

DATE: 01/22/2018  
PO#/TA#/WO#: AEC59F

Site FDEP Facility ID # 139501526 Score: 6  
Site Name: NEWPORT APARTMENTS  
Address: 6860 HARDING AVE  
City: MIAMI BEACH  
County: MIAMI-DADE

Consultant Company: CREATIVE ENVIRONMENTAL  
CONTRACTING, JV LLC  
Address: 700 DESOTO AVE  
City, State, Zip: BROOKSVILLE, FL 34601  
Consultant Rep.: ANGELA KURTH  
Phone #: 904/993/3113

Responsible Party Name: 6860 HARDING AVE LLC  
Address: 210 71<sup>ST</sup> STREET, SUITE 309  
City, State, Zip: MIAMI BEACH, FL 33141  
Responsible Party Rep.: DAVID YEHEZKEL  
Phone #: 305/864-8885

CERTIFICATION:

Qualified Registered Professional Engineer or Registered Professional Geologist Certification.  
I hereby certify that I have supervised the field work (as summarized in the "Recent Site Assessment Activities" section) and preparation of this report, in accordance with Florida Rules and Regulations. As a registered professional geologist and/or professional engineer, as authorized by Chapters 492 or 471, Florida Statutes, I certify that I am a qualified groundwater professional, with knowledge and experience in groundwater contamination assessment and cleanup. To the best of my knowledge, the information and laboratory data summarized in the "Recent Site Assessment Activities" section (including the applicable attachments) are true, accurate, complete, and in accordance with applicable State Rules and Regulations. *Include a hard (paper) copy of this cover page, signed and sealed, when submitting the report electronically.*

Consultant Name: George Foster, P.G.

PE or PG License #: #403

Signature:

Date: 01/22/2018 FLORIDA Stamp or Seal



## TEMPLATE SITE ASSESSMENT REPORT

Site Name: NEWPORT APARTMENTS  
Facility ID #: 139501526  
Date: 01/22/2018

### **SECTION I - Facility & Discharge Information/Initial Abatement** **Site Name**

☐

Cluster Site

Part \_\_\_\_\_

Facility FDEP# \_\_\_\_\_

Site Name: \_\_\_\_\_

#### **I-A) Site Description**

*Please provide a brief description of the site and a summary of site history and operations. What type of business or businesses (if any), non-petroleum as well as petroleum, operated at the former/present site? If petroleum, describe where all former and current fuel tanks, lines and dispensers were/are located (indicating how this information was obtained). Describe any access constraints (utility conduits, canopies, land cover, etc.) which also might influence the placement of monitoring wells and/or the installation of soil borings. Indicate whether there are any owner issues or traffic concerns which might effect when the work can be performed? **Please indicate when the requested information is best illustrated on the site map.***

The site is currently a residential apartment complex. The site layout is similar to the historical layout and the area in between the buildings where the historical UST is located is less than 10 ft wide. Parking at the site is non-existent and entry to the area between the two (2) buildings is difficult.

A 250 gallon UST was located in between the (2) apartment buildings and discovered during a June 17, 1993 Miami-Dade DERM Inspection. The inspection report is included in Attachment

The UST was installed on an unknown date and removed on October 6, 1994.

Site map (Figure 4) illustrating all current & former tanks, lines and dispensers (including utilities, canopies, etc.) is included in Appendix A

## TEMPLATE SITE ASSESSMENT REPORT

Site Name: NEWPORT APARTMENTS  
Facility ID #: 139501526  
Date: 01/22/2018

### III-B) Groundwater Investigation (continued)

*Was groundwater IDW generated? If yes, please explain why disposal on-site was not possible.*

YES	NO	N/A
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Volume of contaminated groundwater disposed of: \_\_\_\_\_ ☐ drums ☐ gallons  
[groundwater results]

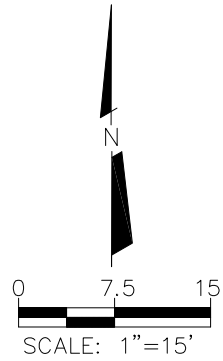
*Was groundwater contamination identified above the applicable Cleanup Target Levels? If yes, indicate locations where highest concentrations detected with depths encountered. If "N/A", please explain.*

YES	NO	N/A
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The 8/9/17 sample from MW-3 contained PAHs above GCTLs, but the results are believed to be anomalous. Previous and subsequent samples from the well were all BDL for all constituents.

Approximate volume of contaminated groundwater: \_\_\_\_\_ gallons  
Plume maps [Figure(s) \_\_\_\_\_] illustrating extent of groundwater contamination is/are included in Appendix \_\_\_\_\_

Z:\GOOGLE DRIVE\PROJECTS\FDEP\MIAMI-DADE\NEWPORT APARTMENTS\CADD\SITE MAP.DWG    DRAWN BY: T. TRAYNHAM    CEC JOB #ATC-S042A



### LEGEND

● - MONITORING WELL

MW-1	- MONITORING WELL DESIGNATION
3-16-17	- DATE SAMPLED
0.31U	- BENZENE CONCENTRATION
0.30U	- TOLUENE CONCENTRATION
0.36U	- ETHYLBENZENE CONCENTRATION
0.72U	- TOTAL XYLENES CONCENTRATION
0.23U	- MTBE CONCENTRATION
0.31U	- NAPHTHALENE CONCENTRATION
0.31U	- 1-METHYLNAPHTHALENE CONCENTRATION
0.31U	- 2-METHYLNAPHTHALENE CONCENTRATION
150U	- TRPH CONCENTRATION
0.031U	- BENZO(a)PYRENE CONCENTRATION
0.031U	- BENZO(a)ANTHRACENE CONCENTRATION
0.031U	- BENZO(b)FLUORANTHENE CONCENTRATION
0.031U	- DIBENZ(a,h)ANTHRACENE CONCENTRATION
0.031U	- INDENO(1,2,3-cd) PYRENE CONCENTRATION

CONCENTRATIONS IN  $\mu\text{g/L}$

U - NOT DETECTED

NA - NOT ANALYZED

CONCENTRATIONS IN "RED" ARE ABOVE GCTLs

BLOCK WALL

CHAIN LINK FENCE

VENT PIPE

DOOR

NEWPORT APARTMENTS

FORMER  
250 GALLON  
FUEL OIL  
UST

MW-1

MW-2

MW-3

CONCRETE

CONCRETE SIDEWALK

HARDING AVENUE

APPROXIMATE PROPERTY LINE PER THE  
DADE COUNTY PROPERTY APPRAISER'S  
WEB SITE

MW-1	MW-1
3-16-17	8-9-17
0.31U	0.160U
0.30U	0.140U
0.36U	0.190U
0.72U	0.200U
0.23U	0.180U
0.31U	1.02U
0.31U	1.02U
0.31U	1.02U
150U	177U
0.031U	0.0521U
0.031U	0.0510U
0.031U	0.0521U
0.031U	0.0521U
0.031U	0.0521U

MW-2	MW-2
3-16-17	8-9-17
0.31U	0.160U
0.30U	0.140U
0.36U	0.190U
0.72U	0.200U
0.23U	0.180U
0.31U	1.02U
0.31U	1.02U
0.31U	1.02U
140U	177U
0.031U	0.0521U
0.031U	0.05210U
0.031U	0.0521U
0.034U	0.0521U
0.031U	0.0521U

MW-3	MW-3	MW-3	MW-3
3-16-17	8-9-17	9-27-17	1-4-18
0.31U	0.160U	NA	NA
0.30U	0.140U	NA	NA
0.36U	0.190U	NA	NA
0.72U	0.200U	NA	NA
0.23U	0.180U	NA	NA
0.31U	1.02U	0.500U	0.500U
0.31U	1.02U	0.500U	0.500U
0.31U	1.02U	0.500U	0.500U
150U	944U	NA	NA
0.031U	0.353	0.0500U	0.0500U
0.031U	0.175	0.0500U	0.0500U
0.031U	0.190	0.0500U	0.0500U
0.031U	0.350	0.0500U	0.0500U
0.031U	0.338	0.0500U	0.0500U

### PRODUCT DATA SHEET

July, 2009

### T6A60 SELF-PRIMING PUMP

#### GENERAL INFORMATION

This pump is designed to reprime automatically in a completely open system – without a need for suction or discharge check valves. There is no need for add-on vacuum pumps or compressors.

#### PERFORMANCE DATA

» Flow (min/max):	- 400 gpm / 1600 gpm
» Maximum Shutoff Head:	- 152 feet (66 psi) <sup>(1)</sup>
» Maximum Suction Lift:	- 25 feet <sup>(2)</sup>
» Speed (min/max):	- 1000 rpm / 1700 rpm
» Maximum Casing Press:	- 98 psi
» Maximum Temperature:	- 160°F
» Maximum Solids Size:	- 3" spherical diameter

#### PUMP SPECIFICATIONS

» Impeller:	- 12.38", open type, two vanes
» Bearing Lubrication:	- SAE No. 30 Oil
» Vacuum System:	- None
» Mech. Seal Lubrication:	- Oil

#### PHYSICAL SPECIFICATIONS

» Suction Size:	- Six-inch flange/female NPT
» Discharge Size:	- Six-inch flange/female NPT
» Total Weight:	- 3905 lbs. (approx.) <sup>(4)</sup>
» Overall Height:	- 7'-6"
» Overall Width:	- 6'-0" (approx)
» Overall Length:	- 11'-0" (approx)

#### MATERIAL SPECIFICATIONS

» Pump Casing:	- Gray Iron No. 30
» Shaft Sleeve:	- Alloy steel No. 4130
» Wear Plate:	- Carbon steel No. 1015
» Mechanical Seal Faces:	- Silicon carbide
» Cover Plate:	- Gray Iron No. 30
» Pump Shaft:	- Stainless steel No. 17-4 PH
» O-rings:	- Buna-N
» Impeller:	- Ductile Iron No. 65-45-12
» Check Valve Flapper:	- Neoprene w/steel reinforcing

#### ENGINE SPECIFICATIONS

» Engine Make/Model:	- John Deere 4045D
» Max. Cont. BHP:	- 72 @ 2500 <sup>(5)</sup>
» Crankcase Oil:	- SAE 10W40 <sup>(3)</sup>
» Safety Shutdowns:	- High water temperature & low oil pressure
» Fuel Capacity/Type:	- 88 gallons of No. 2 diesel
» Fuel Consumption:	- 2.72 gal/hr @ 2000 rpm
» Run Time:	- 32 hours + <sup>(4)</sup>
» Coolant:	- 6 gal. 50/50 water/antifreeze
» Number of Cylinders:	- Four

#### Notes:

- <sup>(1)</sup> Based on 1.0 specific gravity
- <sup>(2)</sup> Depends on flowrate and pump speed
- <sup>(3)</sup> Midrange compromise. See John Deere manual
- <sup>(4)</sup> Includes weight of trailer, pump and engine

## ATTACHMENT C



### SELF-PRIMING PUMP CURVE

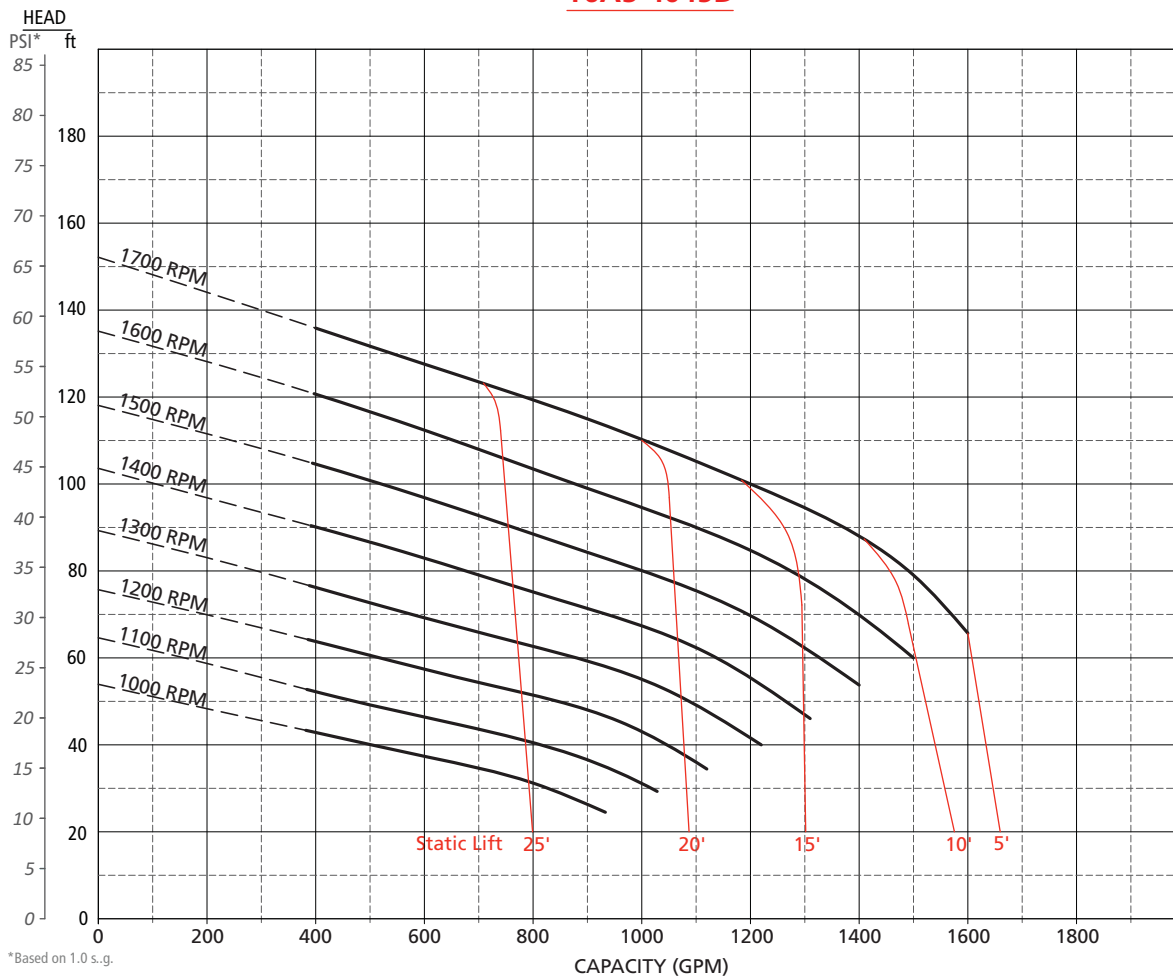
July, 2009

### T6A60 SELF-PRIMING PUMP

#### GENERAL INFORMATION

This pump is designed to reprime automatically in a completely open system – without a need for suction or discharge check valves. There is no need for add-on vacuum pumps or compressors.

#### T6AS-4045D



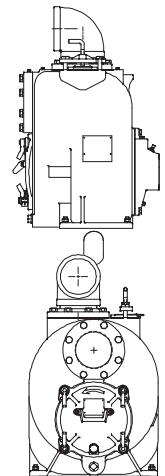
\*Based on 1.0 s.g.

#### PUMP

MODEL	T6A60
CURVENO.	T6AS-4045D-1
SUCTION	6-inch
DISCHARGE	6-inch
MAXSOLID	3-inch
IMP. DIA.	12.38 inches
SPEED	Various
MIN SPEED	1000 RPM

#### DRIVER

Diesel engine and electric motor driven versions are available. Consult your local BakerCorp representative for availability.



### PRODUCT DATA SHEET

January, 2007

### FLIP TOP WEIR TANK

(VE ENTERPRISES VERSION)

#### GENERAL INFORMATION

This fixed-axle tank is fitted with two internal weirs and 14 top inspection doors.

#### WEIGHTS AND MEASURES

» Capacity:	.....	20,000 gallons
» Height:	.....	8'-6 1/4" (grade to tank roof) 12'-8 1/2" (grade to top of handrails when up)
» Width :	.....	8'-6"
» Length:	.....	45'-7 1/2" (tank only), 50'-0" (nose-to-bumper)
» Weight:	.....	33,000 lbs.

#### STRUCTURAL DESIGN

» Floor:	.....	1/4" ASTM A36 carbon steel. "V" bottom sloping from each side to centerline of tank
» Sides/Ends:	.....	1/4" ASTM A36 carbon steel, corrugated shape
» Roof Deck:	.....	1/4" ASTM A36 carbon steel
» Wall Frame:	.....	Corrugations only, no internal frame
» Internal Weirs:	.....	Two internal steel weirs equally spaced to create three compartments inside tank. Overflow weir (forward weir) extends from floor up to one foot from top of tank. Underflow weir extends down from roof and terminates one foot from floor seam at sidewalls. Designed for 16 lbs. per gallon liquid on one side of weir and no liquid on the other side.

#### FEATURES

» Relief Valve:	.....	None
» Valves:	.....	(2) 4" wafer style butterfly valve, Bray series 30 or equivalent, with cast iron body, Buna-N seat and seals, 316 SS stem, Nylon 11 coated ductile iron disk

#### FEATURES – cont.

» Fill Line:	.....	One 3-inch schedule 40 ASTM A106B pipe with cap and securing chain. Line enters front of tank near top with dip tube into first compartment down approx. halfway from bottom of tank where it 90° elbows into compartment.
» Front Drain:	.....	One 4" wafer style butterfly valve. Mounted on 150# weld neck flange on tank side and 150# FPT flange on outside with plug and chain.
» Rear Drain:	.....	One 4" wafer style butterfly valve. Mounted on 150# weld neck flange on tank side and 150# FPT flange on outside with plug and chain. Remote-operation handle.
» Rear Process Outlet:	.....	One (1) 4" flanged and blinded nozzle 18" below roof deck
» Top Doors:	.....	14- 51"x39"x10ga plate lids
» Manways:	.....	Three (3) 22" diameter, passenger side
» Manway Seals:	.....	Buna-N (NBR)
» Stairway:	.....	OSHA compliant non-slip stairway with handrails and guardrails
» Walkway:	.....	Full length of tank with guardrails on both sides; door handles accessible

#### SURFACE DETAILS

» Exterior Coating:	.....	High gloss polyurethane
» Interior Coating:	.....	Chemical resistant lining

#### TESTS/CERTIFICATIONS

» Test Performed:	.....	100% water-tested to full capacity by OEM, plus level 1, 2 & 3 QMS inspections by Baker Tanks
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